

SECTION V

ALTERNATIVES

A. INTRODUCTION

The Alternatives section comprises the main body of the Island County Ground Water Management Plan. In this section twenty management options are identified and evaluated in detail. For clarity, the management options are organized under six general headings: public involvement and assistance, conservation, ground water monitoring and evaluation, ground water recharge, ground water protection designations and programs, and other. No prioritization is suggested by the order in which the options are presented.

A specific recommendation and rationale concludes each of the management options. Not all management options are recommended for implementation at this time. Implementation needs for those options recommended for immediate implementation are in the Preferred Program and Implementation Plan (Section VI). Ongoing options will be reviewed and monitored using the procedures outlined in the Effectiveness Monitoring Plan (Section VII).

B. PRELIMINARY SELECTION AND EVALUATION OF MANAGEMENT OPTIONS

This section explains the procedure followed by the GWAC to address ground water management problems defined in the Problem Definition document (Section III). Management options were solicited from the GWAC to address their specific ground water concerns. Five matrices were designed to facilitate in the evaluation of the management options identified. Each option was evaluated against five criterion, including resource management, local acceptability, implementation concerns, financial costs, and consistency with regulatory standards. The results of the matrices reflect the cumulative response of the GWAC. Additional details regarding the matrix evaluation efforts, including a summary of the matrix results are found in Appendix G.

C. OPTION PAPER DEVELOPMENT

Following the completion of the matrices, the GWAC prepared twenty option papers to address each of the management options. For each management option, a desired objective was defined and existing policies and programs were evaluated. At least two suggested strategies were identified for each objective, including a no action strategy. GWAC concerns and

strategies for improvement or modification are evaluated in detail.

For each strategy, the potential environmental impacts which may result if the strategy is implemented are recognized. Discussion of environmental impacts consist of objective statements designed to address broader impacts to the environment. These statements are not intended to represent a thorough evaluation of all impacts to the environment, but are intended to recognize those general impacts which may result if a specific strategy is selected over another. A threshold determination will be made following public review of this document.

D. OPTION PAPER FORMAT

Each of the twenty option papers is organized in the following format:

- Problem Statement
- Objective
- Existing Policies and Programs
- Suggested Strategies
- Evaluation of Strategies and Environmental Impacts
- Recommended Strategy
- References

The option paper topics are listed below and appear under the following broad headings:

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ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #1

Title: Education Program

Problem Statement: Public perception and understanding of ground water problems, and their possible solutions, needs improvement. Without a well-informed public, ground water protection efforts could be misunderstood and could lack both political and participatory support.

Objective: The objective of an education program in Island County will be to help the public understand:

- o the current knowledge of the characteristics of Island County's ground water resources;
- o the confirmed and potential adverse impacts to ground water of various activities; and,
- o programs and regulatory efforts to protect and conserve Island County ground water.

Ultimately, an objective and knowledgeable public will:

- o be able to make appropriate decisions on water resource issues; and,
- o increase the effectiveness of conservation efforts and other programs through voluntary cooperation and participation.

Existing Policies or Programs: Some effort has gone into education on ground water topics. Materials such as brochures, which provide information on topics ranging from seawater intrusion to conservation to handling of household hazardous waste, are available for distribution through the Island County Health Department, the Island County Solid Waste Department, the Soil Conservation Service, and the WSU Cooperative Extension. The Solid Waste Department distributes bimonthly newsletters on hazardous waste planning and household hazardous waste management, directly contributing to ground water protection efforts by encouraging practices which reduce ground water contamination.

The Health Department has held workshops in water system management. The GWAC sponsored a series of workshops on

ground water management issues in the fall of 1988. These workshops were well-attended, indicating substantial interest in the information and issues, and several favorable comments on the workshops were received.

The State Departments of Ecology and Health offer informational brochures, videotapes, and other materials. However, a consistent method of dispersal of these materials is not fully developed in the County.

Suggested Strategies:

Strategy 1:

Implement a comprehensive, ongoing public education program to:

- o disseminate ground water information on a regular basis;
- o to support the conservation, data collection, and technical assistance programs; and,
- o make staff, materials, and equipment available to assist the public in understanding ground water issues and preventing ground water problems

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

Public education is an important and successful element of ground water protection programs nationwide. Such programs can be relatively inexpensive, easy to implement, and are generally less disruptive than remedial actions or regulatory controls.

Some expense will be incurred with implementation of an education program. The value of a successful program, in terms of benefits to the resource, should soon outweigh the costs, however, especially if compared to costs of ground water remediation. An education effort aimed at preventing ground water problems before they become widespread can prevent significant future expenses.

Efforts to increase the public health and safety can be enhanced through public education. A well-informed

public is better able to understand the health effects of various activities, and can thus avoid situations which threaten their own health and the health and safety of others.

One of the most important elements of an education program is the dissemination of objective, factual material in a technically-oriented yet understandable format.

Environmental Impacts: Some environmental impacts of a successful education program would be positive: efficient water use practices would become more widespread, slowing the rate of ground water depletion, and awareness of the effects of potentially contaminating practices would reduce such contamination. Water made available through conservation measures could allow additional development and associated adverse environmental impacts, however.

Strategy 2:

As indicated above, previous and current education activities have increased awareness of ground water issues in Island County. Also mentioned, however, are the apparent and persistent misunderstandings among many people of ground water problems and of efforts to address such problems. Accurate perception is critical to an effective decision-making process. The effectiveness of conservation programs and other ground water protection efforts depend, in large part, on the effectiveness of public education.

Without an education program, awareness of ground problems might only increase if the problems become immediately threatening. Protection efforts would become remedial only, rather than preventative. Costs of prevention of problems are generally less costly and difficult than ground water remediation.

The public could put themselves or others at risk due to lack of awareness of current and potential ground water recharge, availability, or contamination problems. While new regulations may help avoid this risk, a successful public education program can further help the public avoid such problems.

Environmental Impacts: The no-action Strategy could have direct adverse environmental impacts on Island County ground water quality and quantity. Potentially contaminating activities not addressed or not adequately

covered by other County efforts will likely continue, increasing the occurrences of ground water contamination. Individuals using inefficient agricultural, commercial, and domestic water use practices would not be made aware of the adverse impacts of these practices and may continue to waste water. The cumulative impacts of an uninformed public could conceivably contribute to significant adverse impact to ground water supplies.

Recommended Strategy: Strategy 1, a long-term, comprehensive education program, which continues and expands on current efforts, could provide significant protection of Island County ground water resources. The benefits of such a program, if successful, will outweigh the environmental and financial costs, especially if possible future costs of remediation are considered.

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #2

Title: Technical Assistance Program

Problem Statement: An expanded, more centralized, and comprehensive program is needed to ensure adequate levels of technical support on ground water topics are available. The following shortcomings have been identified in current technical assistance efforts:

- o Regular small system technical seminars are needed. These require considerable staff preparation time and some presentation materials; current staff are unable to devote time necessary to offer such seminars.
- o Health Department and DOH staff are able to conduct on-site visits to water systems only when problems arise. Many of these problems could possibly be averted if site visits could be conducted for less urgent situations.
- o The Health Department operates a grant-funded program offering information on septic system operation and maintenance. While septic systems have not been identified as a source of serious ground water concern, this program helps to maintain this status. Grant funds for the program run out in February of 1992.
- o No technical or educational programs target owners of single-home domestic wells. While some owners of these systems voluntarily seek advice and assistance from the Health Department, the remainder may not be completely aware of potential problems and of technical assistance available through current programs.
- o While the Health Department occasionally holds workshops on changing regulations and guidelines, there is no ongoing technical or educational programs targeting local water system design engineers, well drillers, and other professionals. Regular workshops to inform these professionals of new technologies, changing regulations, and ground water information updates should be offered.
- o There is a lack of quality technical and educational materials available for distribution.

Objective: Enhance and expand technical assistance functions currently carried out by County staff. Specific functions

include helping purveyors, and individual well owners, and others in:

- o making the most efficient use of water;
- o identifying possible funding sources for system improvements;
- o preventing ground water contamination or depletion;
- o understanding and meeting state and local water resource regulations; and,
- o selecting appropriate water system design.

Existing Policies or Programs: In addition to the current activities described above, the USDA Soil Conservation Service has provided free technical assistance on Whidbey Island since 1965. Camano Island is served by the Lake Stevens SCS office. Although aimed generally at the agricultural community, SCS programs cover a wide range of resource protection, including protection of ground water. Only two staff members are available on Whidbey Island, however, and a program encompassing both Camano and Whidbey Islands does not exist.

Washington State University Cooperative Extension Service is also very active in Island County in educating residents on all aspects of the environment. Because of the wide range of services and activities offered, the local agent is able to devote only a portion of the Extension's resources to technical assistance in water resources.

The Board of Island County Commissioners officially established a Public Works Department in 1971, pursuant to Chapter 13.01 ICC, for the purposes of "establishing, maintaining, and operating systems of solid waste, sewage, water, drainage, and other public services authorized by the Board." The provisions of Chapter 13.01 ICC have never been fully implemented, however. The Coordinated Water System Plan recommends that the BICC review Chapter 13.01 ICC and consider implementation of some of the provisions of the code. Furthermore, the CWSP recommends that the Public Works Department be tasked with the development and implementation of a technical assistance program to water purveyors and Regional Water Associations.

The State Department of Health has one full-time employee devoted solely to providing technical assistance to water systems. Additionally, the district engineer and water quality sanitarian working out of the Northwest Drinking Water office in Seattle make frequent site visits; their area of responsibility covers several counties, however, and they are unable to devote the time necessary to accommodate the scope of technical assistance suggested here.

Suggested Strategies:

Strategy 1:

Develop and implement a program to provide Technical Assistance to individual well owners; water system managers and water purveyors; water resource professionals (well drillers, etc.); and other targeted groups as identified.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

The Island County Coordinated Water System Plan (CWSP) identifies the development of a technical and financial assistance program as being one of the highest priorities in order to achieve CWSP objectives. The majority of public water systems in Island County are operated or managed by volunteers with limited time, knowledge, or experience in water system management. A Technical Assistance Program might provide these water systems with support sufficient to head off severe problems before they occur.

Owners of single home domestic wells would benefit greatly from a Technical Assistance Program. Technical assistance offered from the State is generally geared toward larger water systems, leaving the smallest systems and single home domestic well owners with limited technical assistance availability. These individuals rarely request or receive assistance or advice until a problem is experienced. A program which makes useful information available to these single domestic water systems could reduce the occurrence of health and resource-related problems associated with these systems.

Developers, well drillers, and water system design engineers would also benefit from a technical assistance program. A readily accessible source of the most current and accurate water resources information could help ensure that these professionals provide quality services to their customers, further reducing the incidence of water-related problems in the future.

One shortcoming of a program of the magnitude proposed here is that it requires significant funding and staff resources. It is possible, however, that these expenses could be at least partially offset by grant funding from the State.

Environmental Impacts: No adverse environmental impacts would result from implementation of a technical assistance program. Instead, environmental impacts resulting from a technical assistance program would be positive, in much the same fashion as in the Education Program (option paper #1). With greater awareness of potential negative impacts that particular activities or practices may have, users of the technical assistance program will tend to avoid or correct these activities or practices.

Strategy 2:

Current technical assistance activities are relatively successful; however, as previously mentioned, certain inadequacies exist. Also, as population growth continues in Island County, demands on water systems and on ground water resources will increase proportionally, creating a greater need for comprehensive technical assistance. The relative degree of success of current efforts will decline as greater demands are put on staff and other resources devoted to technical assistance.

Environmental Impacts: As these demands on current technical assistance efforts increase, and the overall effectiveness of these efforts decrease, the potential for adverse environmental impacts increases.

Recommended Strategy: Strategy 1 is recommended for implementation. Additional staff and other resources should be devoted to the development, implementation, and maintenance of a Technical Assistance Program. A Technical Assistance Program could help alleviate current ground water problems, and could head off more serious problems. Benefits of a successful Technical Assistance Program will outweigh expenses, especially when the preventative benefits are compared to the high costs of remedial measures.

References:

Chapter 13.20 Morro Bay Ordinance. Building Limitations. March 1988. City of Morro Bay.

Annual Water Report, 1989. Community Development Department, City of Morro Bay.

Thurston County Planning Department, 1989. Management Options for Ground Water Protection in Thurston County, Washington.

USDA - Soil Conservation Service, 1976. Assistance Available from the Soil Conservation Service, Bulletin 345. US Gov't Printing Office, Washington, DC.

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #3

Title: Conservation Program

Problem Statement: Population growth in Island County has significantly increased withdrawals from the ground water aquifers. This has diminished available supplies of freshwater and increased the potential for contamination of ground water by seawater intrusion. Efficient use of ground water is a widely recognized element of a complete water resource management program, yet no comprehensive conservation program exists in Island County to reduce aquifer withdrawal rates, extend the life of the resource, reduce the potential for seawater intrusion, and decrease the stress on septic and wastewater disposal systems.

Objective: Encourage and require water conservation in Island County in order to lessen the effects of increasing ground water extraction upon the County's limited ground water resource.

Existing Policies and Programs: Presently there is no comprehensive water conservation program in Island County. Existing policies and programs are comprised of the following:

1. The Island County Coordinated Water System Plan (CWSP) requires the following for new and expanding water systems:
 - a. Installation of individual and source meters.
 - b. Implementation of rate structures that encourage water conservation.
 - c. Development and implementation of a leak detection and repair program.
 - d. Outlining water use restrictions for drought periods in Operation and Maintenance Agreement.
2. The Island County Health Department (ICHD) and Department of Health (DOH), through the Salt Water Intrusion Policy,

require water conservation strategies be incorporated into the operation and maintenance agreement for systems at risk for seawater intrusion.

3. The Island County Planning Department (ICPD) can require the inclusion of water conservation practices as caveats in development approval.
4. The Memorandum of Understanding (MOU) between the Washington State Department of Ecology (DOE) and Island County outlines metering requirements for all new permitted wells and all new exempt potable water supply wells. The MOU also commits to a vigorous pursuit of conservation efforts through public education, plans, ordinances, and permit provisos.
5. The draft "Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs," produced by a joint task force of the Washington Water Utilities Council (WWUC), DOE, and DOH, outlines an approach to identification of future water supply requirements and the development of comprehensive conservation programs.

Suggested Strategies:

Strategy 1:

Create and implement a program which encourages conservation of Island County's potable water resources.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

As stated in the CWSP (page V-1),

"The indication of limits to ground water supplies are strong enough in most areas of the County that it should be a priority of all ground water users to employ conservation as a primary alternative to additional well construction."

Water conservation must not be limited as a strategy

employed only during severe water shortages or drought years. "The idea of the 'wise use of water' has been advanced...as the best way to avert a water crisis" (Beecher and Lauback, p. 19). Even in those areas not currently experiencing quantity problems, the efficient use of water is a sensible approach to avoid future problems. This is especially true in Island County given its finite ground water supply, and its designations as a Critical Water Supply Service Area and a Sole Source Aquifer.

It is the policy of the State of Washington to promote and encourage efficiency in the use of public water resources. According to the Water Resources Act of 1971,

"...state and local governments, individuals, corporations, groups and other entities shall be encouraged to carry out water use efficiency and conservation programs and practices...", and,

"Existing and future generations of citizens of the state of Washington should be made aware of the importance of the state's water resources and the need for wise and efficient use and development of this vital resource" (RCW 90.54.180).

Successful conservation programs, namely those which reduce demand ten percent or more, can be relatively inexpensive (CWSP, p. V-2). For instance, retrofit kits often pay for themselves within one year's time through savings resulting from decreased water consumption. Water conservation also reduces the demand on water system facilities, as well as waste water and septic systems. Furthermore, energy cost savings are yet another direct result of efficient water use.

Unfortunately, intensive conservation measures may be viewed as threatening by some residents. It is possible that water saved through conservation could support additional growth in some areas. It is essential that efficient water use practices be linked to maintaining the current quality of life, and to avoiding future water quality and quantity problems.

Environmental Impacts: No direct adverse environmental impacts would result from implementation of a water conservation program. Instead, impacts would be

positive in terms of lessening existing ground water withdrawal and alleviating the adverse effects associated with such withdrawal. Additionally, reduction in domestic use generally translates to reduced demand on sewage systems, thereby reducing the potential of ground water contamination through failing sewage systems.

However, it should be noted that supplies of ground water saved through conservation could occasionally be used to support additional growth where such opportunities did not exist prior to implementation of conservation measures. Thus, some indirect environmental impacts associated with additional growth may result from implementation of a County-wide conservation program.

Strategy 2:

The benefits of implementing conservation measures may not be immediately apparent, except in those areas currently experiencing water resource problems. Without implementation of a conservation program, however, inefficient water use would likely continue in Island County. Given the limitations of the resource, the costs of remediation versus that of prevention through conservation, a growing national attention of water resource issues, the failure of individuals, water systems, and local government to increase water use efficiency would be inappropriate and irresponsible.

Environmental Impacts: Failure to implement a County-wide conservation program could potentially lead to premature depletion of available water resources, and, as noted above, could conceivably be linked to undue loading of sewage and wastewater treatment systems. Both of these effects could have detrimental impacts on water quality and on the capacity of the resource to support human activities and wildlife habitats. On the other hand, possible adverse effects noted above under environmental impacts evaluation of Strategy 1 would be avoided in absence of a County-wide conservation program. Initial economic impact would be avoided, but high future costs can be expected without immediate implementation of a conservation program.

Recommended Strategy: Strategy 1 is recommended for implementation. A County-wide conservation program can

provide significant protection of Island County drinking water resources at an acceptable cost/benefit ratio from both economic and environmental viewpoints. The educational value of such a program in itself will generate public concern and interest in protecting the resource. The additional supplies made available through more efficient water use will help to ensure a sustained and reliable supply for the future.

References

American Water Works Association Document M6. Water Meters-Selection, Installation, Testing, and Maintenance. Beecher and Lauback.

City of Phoenix Water and Wastewater Department, 1986. Water Conservation Plan.

ICC 8.09. Potable Water Source and Supply.

ICC 13.03A. Minimum Standards for Water Works.

Island County Agriculture/Forestry Council, 1990. Second Draft Outline for AG and Forestry Water Resources Management in Island County.

Memorandum of Understanding between Washington State Department of Ecology, Water Resources Program and Island County, Washington, December, 1990.

Island County Coordinated Water System Plan, 1990.

New York State Department of Environmental Conservation, 1989. Water Conservation Manual for Development of a Water Conservation Plan (Draft).

RCW 19.27. State Building Code, 1989.

RCW 90.54. Water Resources Act of 1971.

Washington State Department of Ecology, Department of Health, and Water Utility Council, 1990. Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs (Draft).

Washington State Department of Social and Health Services, Guidelines for the Preparation of Water Shortage Response Plans, June, 1988.

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #4

Title: Building Code amendments

Problem Statement: Maximum use performance standards for plumbing fixtures, as currently required by the State Plumbing Code, may not be stringent enough in and of themselves to conserve significant volumes of ground water.

Objective: Minimize ground water use through requiring the use of water-conserving fixtures.

Existing Programs or Policies: The State Plumbing Code is often revised annually, but is published in its entirety only once every three years. The County regularly adopts, by reference, this updated Uniform Building Code and the Uniform Plumbing Code into the Island County Building Code, 14.01 ICC. To avoid redundant costs of adoption, annual revisions of the State Building or Plumbing code are usually not immediately adopted into local code, but are instead adopted at the time of the three-year update.

Current State standards require use of low-volume plumbing fixtures. The Island County Building Department is following the state-wide convention of beginning implementation of these requirements after January 1, 1991, thereby allowing merchants and contractors to eliminate existing stocks of fixtures which do not meet the new State requirements. More stringent State standards go into effect on July 1, 1990, and will be immediately enforced in Island County.

The Comprehensive Plan recommends that "Utilization of water and energy conservation techniques should be encouraged in all developments. Examples include water conservation fixtures..."(II-25).

Suggested Strategies:

Strategy 1:

Amend the Island County Building Code to require use of ultra-low-volume fixtures in all new construction and remodeling.

Strategy 2:

Develop specific policy language requiring installation of water conserving devices through Planning Department approval process.

Strategy 3:

Take no action.

Evaluation of Strategies:

Strategy 1:

In 1989, the Washington State Building Code Council was directed by the state legislature to amend the Water Resources Act of 1971 by adding requirements for low water consumption plumbing fixtures, effective July 1, 1990 (Chapter 51-18 WAC). As amended, State Plumbing Code language requires low-flow fixtures (3.5 gallon per flush toilets, 3.0 gallon per minute faucets and shower fixtures), a vast improvement over previous standards. Additionally, more stringent standards for low-volume plumbing fixtures will become effective on July 1, 1993; the Island County Building Department will begin enforcement of these standards upon that date. The Council will be conducting a study in the interim on the availability of water efficient fixtures and the potential impact of their use on sewerage and septic lines and treatment plants. In the meantime, however, the legislature has prohibited, effective July 1, 1990, cities, towns, and counties from amending the code revisions and standards established for low water consumption plumbing fixtures, pending completion of the study.

Environmental Impacts: Adverse environmental impacts could result from implementation of this option in terms of conserved water contributing to additional development. In absence of this development, beneficial impacts to ground water quality and quantity would occur.

Questions have been raised about the effect of reduced wastewater flow on the treatment effectiveness of on-site sewage system drainfields as constructed under current standards, and subsequent adverse environmental effects on ground water quality. Some data shows, however, that the treatment efficiency of septic tanks is enhanced under reduced flows (Department of Health, 1990).

With implementation of this strategy, economic benefits

could occur through savings on water and electric rates.

Strategy 2:

The Comprehensive Plan language cited above gives the Island County Planning Department authority to impose conditions on approvals for proposed development. In the past, this has included the use of low-volume fixtures and other water use efficiency techniques; as a result, some homeowner's covenants include specifications for water-conserving fixtures and techniques. Also, the awareness of the finite nature of Island County ground water and current problems has already prompted a few individuals and associations to voluntarily use water-efficiency fixtures and techniques.

Additional Planning Department authority to require the use of low-flow plumbing fixtures is provided through implementation of State Environmental Policy Act (SEPA) procedures. Activities or proposals which are subject to SEPA, and which have a potential to adversely affect ground water quantity or quality, may be issued a "Mitigated Determination of Non-Significance", or MDNS. The term mitigation, in this context, refers to conditions which are imposed on the activity or proposal to ensure that adverse effects are minimized to the level of non-significance. While this occurs frequently during Planning Department operations, the Planning Department would be given authority to place such conditions on a wider range of projects if Island County, or a portion(s) thereof, is declared an "Environmentally Sensitive Area" (see option paper #11).

Environmental Impacts: Same as Strategy 1.

Strategy 3:

Following the no-action strategy would not significantly deter ground water management efforts in Island County. Current Comprehensive Plan implementation has led to the installation of low-volume fixtures in several new developments, and SEPA provides additional authority for the Planning Department to require use of such fixtures.

As mentioned above, current State Building Code standards do provide requirements for low-volume fixtures, though more stringent standards would be more effective in conserving ground water. In 1993, the State Plumbing Code will again be amended, imposing more stringent standards. These standards will then take

effect in Island County upon adoption into local building code.

Environmental Impacts: The no-action strategy could allow more adverse environmental impacts to occur than Strategies 1 or 2 through less efficient use of ground water. Ground water may be withdrawn at a higher rate than if Strategies 1 or 2 were implemented. Successful conservation and education efforts, as proposed in option papers #1 and #3, may offset these possibilities of additional withdrawals.

Recommended Strategy: Strategy 3 is preferred. Current State Plumbing Codes already require the use of low-flow fixtures. More stringent requirements will take effect in Island County on July 1, 1993. Planning Department authority through the Comprehensive Plan and through SEPA is effective in ensuring use of water-efficient fixtures in some new development. An additional consideration is the GWMP Conservation Program (option paper #3), which, if successful, will contribute to satisfying the ultimate objectives of this option paper through a variety of techniques.

References:

Department of Health, State of Washington, 1990. Washington's On-Site Newsletter. Volume 7, Number 4.

ICC 14.01. Island County Building Code.

Island County Planning Department, 1977. Island County Comprehensive Plan: Planning Policy, Phase Two. (Revised 1984).

WAC 51-18. Washington State Water Conservation Performance Standards.

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #5

Title: Data Collection and Management Program (DCMP)

Problem Statement: Existing ground water data on quality, quantity, and recharge to adequately characterize and protect ground water resources in Island County is lacking. A comprehensive ongoing ground water monitoring and data management program does not exist.

Objective: To develop an implementation scheme to collect and analyze data in areas of quality, quantity, and recharge as described in the Data Collection and Analysis Plan (DCAP) and as deemed necessary to support other GWMP programs and recommended regulatory and non-regulatory options. Establish an efficient data management system in the County to maximize use of existing and future ground water data.

Existing Policies and Programs: Comprehensive data collection and management efforts outlined in this program will serve to supplement and enhance existing efforts to better evaluate hydrogeologic conditions and trends in the County.

The GWMP Hydrogeologic Characterization (Appendix A) identified five geographic areas, Focus Areas, based on existing data which indicate that water quality has deteriorated as a result of seawater intrusion and/or over pumping of ground water. These areas may be subject to water quality and/or quantity problems. The boundaries of the Focus Areas will be subject to continuing review based on possible management requirements and new data.

The DCAP (Appendix D) is designed to provide guidelines for meeting Island County ground water information needs. Certain methods and criteria for the collection of ground water quantity and quality data are recommended.

The Data Management Plan^o (DMP; Appendix E) is designed to characterize data to be collected and to describe the methodology for data handling. The long range objective of this document is to provide the County with a practical and effective means of recording and reporting ground water data which may be needed to carry out the provisions of the GWMP. Presently, elements of the database management system have been made operational on a computer system at the Island County Health Department (ICHD). However, the existing data management system requires additional work for efficient data

retrieval and evaluation. The ground water information database will reside with ICHD.

Suggested Strategies:

Strategy 1:

Seek implementation of a long-term ground water quality and quantity data collection and management program for Island County. Continue to improve the existing data management system for efficient data entry and retrieval. In addition, continue to enter existing ground water data in the County database in accordance with Ecology guidelines for GWMPs.

Strategy 2:

Take no action.

Evaluation of Suggested Strategies:

Strategy 1:

The Data Collection and Management Program intends to focus efforts in geographic areas which have had a history of ground water quality and quantity problems and in areas where a potential for quality and quantity problems exists. The Focus Areas were identified in the DCAP as areas which have experienced ground water quality or quantity problems. Focus Area boundaries predominantly reflect surface water drainage basins and not hydrogeologic basins, and therefore may be excluding areas with unknown ground water problems.

Prior hydrogeologic characterization of existing ground water data in the County has indicated that data is insufficient to allow for the delineation of areas which require special ground water protection for regulatory purposes. A Ground Water Development Classification Matrix (option paper #6) is being developed to provide a checklist of important ground water parameters to be used on a case-by-case basis to evaluate the overall seawater intrusion risk resulting from the development of a new well. The matrix, supplemented by additional data made available through the DCMP, will be used to identify areas in the County requiring special ground water protection.

Additional data collection in the County will also assist in refining water budget estimates contained in a recent hydrogeologic assessments, including USGS (Sapik

et al., 1988) and Hart Crowser (Coordinated Water System Plan, CWSP, Appendix K) reports. The DCMP intends to improve existing estimates of precipitation, evaporation, and runoff.

It should be a priority in the DCMP to devote additional time and effort towards bringing the existing data management system to the stage where data retrieval and evaluation can be conducted in an efficient manner. In addition, a dedicated staff member should be assigned to entering existing ground water data, in accordance to Ecology's Data Reporting Manual for the Ground Water Management Program.

DCMP activities will be coordinated with Ecology. Ground water data and reports will be submitted to Ecology annually in accordance with Ecology's Data Reporting Manual for the Ground Water Management Program. The Data Management Plan describes data hardware and software used and outlines a procedure for meeting minimum transmittal requirements. Three categories of data will be transmitted to Ecology, including well construction and water level information, water quality data, and any other types of data. Data will be error-checked and verified by the County before being transmitted to Ecology.

Ultimately, certain policy actions may be initiated based on the outcome of additional data collection efforts and implementation of the Ground Water Development Classification Matrix. These could include the identification of Environmentally Sensitive Areas under SEPA, the establishment of Water Resource Overlay Zones, or the establishment of Aquifer Protection Areas. Any of these policy actions require that sufficient data be available to support such ground water management actions.

Data collection methodologies are described in the DCAP. The DCMP recommends six data categories. These are:

	Page
1. Well Inventory	V-27
2. Ground Water/Lake/Wetland Level Monitoring	V-30
3. Ground Water Usage Monitoring	V-33
4. Water Quality Monitoring	V-36
5. Weather Data Collection	V-39
6. Runoff Data Collection	V-44

Environmental Impacts: No direct adverse environmental

impacts will result from the activities proposed in the DCMP. The program is designed to respond to the County's ground water data needs, minimize adverse impacts on the resource, and improve the basis for ground water development decisions. However, economic impacts may result from restrictions imposed by ground water management requirements resulting from analysis of additional ground water data.

Strategy 2:

Failure of the GWMP to recommend the need for a long-term water quality and quantity monitoring and data management for Island County will result in the continued absence of a coordinated ongoing system to detect trends in ground water quality and quantity. Without adequate information to evaluate the resource and effective data management, efficient allocation of government resources for ground water protection and management will be very difficult. Without data collection and management, the design of an adequate feedback mechanism for the GWMP will be impossible.

The process of delineating areas in the County which are susceptible to ground water quality and quantity problems is dependent on the management of existing data and on the availability of additional data. Policy actions which may be initiated based on the outcome of the DCMP, such as the identification of Environmentally Sensitive Areas under SEPA, will not be possible.

Environmental Impacts: The absence of a ongoing data management system to effectively use existing ground water data may result in land use decisions which do not adequately protect the resource. Basing ground water development decisions on existing limited ground water data may increase the risk of adverse environmental impacts on ground water quality and quantity. Surface water quality, flora and fauna, and environmental health may be adversely impacted if long-term ground water trends are not documented.

Recommended Strategy: Implement an ongoing Data Collection and Management Program to enable the County to improve its understanding of ground water resources, to make informed ground water development decisions, and to better manage the resource. Early detection of water quality and quantity problems allows them to be addressed when they begin to become apparent, a time when they are generally easier and less costly to correct.

WELL INVENTORY

Objective: The objectives of a well inventory in Island County are to: first, identify all wells (both private and public, including abandoned wells if possible); and second, gather necessary ground water information for all wells.

Background: An inventory of all known public water systems in Island County was conducted in 1982 and updated in 1985. This inventory is presented in the report Preliminary Assessment: Water System Issues in Island County (January 1985) compiled by the ICHD, ICPD and DOH. The purpose of the inventory was to compile information on water quality, water quantity, system reliability, and water system coordination and planning. Water system information was obtained through a questionnaire, and ICHD, DOH, and USGS records. The inventory identified 466 public water systems. Presently, over 650 public water systems are known in Island County.

The Water Facilities Inventory (WFI) is a DOH public water supplies inventory of public water systems. The WFI is used as a tool to track system owner and system characteristics and is being updated as existing unregulated, new, and expanding water systems are registered in the County. Unregulated public water systems which become apparent during the home loan, sewage permit, and building permit processes. ICC 8.09 requires approval of well sites and quality and quantity parameters prior to development. In addition, private wells located near any activity requiring County decision making are reviewed for potential adverse environmental impacts as part of the ICHD land use review program. Well log reports for all wells are being filed with the ICHD.

Ecology is presently developing a unique well identification system and is evaluating possible computer system designs and implementation schemes. Once this work has been completed a strategy for well abandonment will be developed. Presently, no draft schemes have been made available.

Suggested Strategies: .

Strategy 1:

Develop and implement a well inventory of all wells in Island County by mailing a survey to all property owners. Coordinate with Ecology's efforts to devise a scheme for well identification and abandonment.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

The well inventory effort in Island County could begin with the design of a survey aimed at identifying private and public water systems. One way of reaching all well owners is to enclose a survey using County Assessor records of property owners.

A properly executed inventory could assist in recording at least 80% of all wells in the County, including public and private wells. The identification of wells in Island County will contribute significantly to the efforts of many County Departments, including Planning, Health, Engineering and the Assessor's office.

The DCMP Sub-Committee has developed a survey and is discussing the feasibility of utilizing County Assessor's or Treasurer's records for address purposes to undertake this effort. A well inventory survey example is presented in Appendix J. In addition, an assessment of logistics and cost of implementing the well inventory is being evaluated. The result of the survey would be verified and possibly field checked before being entered into the the County data managment system.

The main objective of Ecology's Well Identification Task Force is to tag all wells in the State with a unique well identification number and develop a method to correlate this number with existing ground water data associate with the site. The designed system will be available and easy to use.

Although the results of Task Force effort's would be extremely useful in Island County, the length of time and cost required to successfully accomplish this effort has not been defined by the State. The authority of the County in integrating such a system into its existing framework is also unclear. The local effort involved in such an undertaking may be met with some resistance, perhaps relating to the time and expense involved. The alternatives will need to be evaluated once a draft scheme has been presented to the County and reviewed by the potentially affected agencies.

Environmental Impacts: Implementation of a well inventory in Island County would have no long-term

adverse environmental impacts; instead, an inventory would assist in evaluating future ground water availability and quality and in promoting ground water protection. However, the cost and time required to conduct a successful survey, manage the data, and the possible poor outcome may cause some to question the validity of conducting such an effort.

Strategy 2:

Existing inventory efforts in the County have and will continue to assist in locating wells throughout the County. The WFI reports are constantly being updated by the ICHD and are useful in assisting the County in locating wells that were previously unregulated. The ICHD, through local and state codes and programs, requires new public water systems to register their wells and to comply with local and state quality and construction specifications.

Although WFI reports assist in identifying new wells and other wells which indirectly become apparent, they do not represent an upfront and aggressive approach in pursuing the remaining unrecorded public and private wells in Island County.

Environmental Impacts: No adverse environmental impacts would result directly from the implementation of this strategy. The implementation of this strategy may be regarded as the most viable and affordable means to identify wells in the County; however, it is a less aggressive approach in meeting the desired objective. DOH's WFI and ICHD requirements and record keeping are presently recording new, public, and existing wells associated with land development review activities. No County program is in place to provide each well with a unique number and to record existing individual wells.

Recommended Strategy: The GWAC recommends Strategy 1 for implementation. To effectively manage and protect ground water resources in Island County, a well inventory identifying as many wells as possible should be undertaken. Without addressing all wells in ground water management, the potential for adverse environmental impacts may be increased. Although somewhat of a laborious, costly, and time consuming task, a well inventory is the first step towards comprehensive ground water protection.

GROUND WATER/LAKE/WETLAND LEVEL MONITORING

Objective: The ongoing water level monitoring program identified in the DCAP should be implemented using a network of existing wells, lakes, and wetlands in the County. Regular water level monitoring will assist in determining regional water level trends and making ground water development decisions aimed at protecting the resource.

Background: Well water level measurements in the County have been conducted in a number of USGS water resources investigations (Jones, 1985, and Sapik et al., 1988) and are contained in the USGS database. An insufficient amount of water level data are available to indicate whether long-term trends exist. Ecology measures water levels in 10 deep wells semi-annually (April and August). Quarterly water level measurements are also conducted at the County landfill. Currently, the County does not regularly monitor water levels in public or private wells. Wetland and lake levels are not measured.

Suggested Strategies:

Strategy 1:

Develop and implement a water level monitoring program described in the DCAP incorporating selected wells, lakes, and wetlands found in areas with confirmed or potential ground water quality and/or quantity problems.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

Water level monitoring should be conducted for wells County-wide with emphasis on wells in areas with ground water quantity and/or quality problems or concerns, such as the Focus Areas. Initial water level monitoring efforts would focus on wells, lakes and wetlands which best reflect aquifer characteristics. Emphasis would be placed on wells used in previous ground water studies and on public water supply wells, including those used by USGS, Ecology, and ICHD. The DCAP recommends 20 to 40 wells per Focus Area to characterize existing conditions. In addition, wells, lakes and wetlands in the vicinity of major pumping centers and in areas which

are suspect of water level declines would be given priority. The wells monitored for water levels should overlap with wells used for water usage and water quality monitoring.

Selected wells would be examined for proper construction, hydrologic connection, accessibility, and where possible, wells would be selected so various aquifers are represented. Careful attention must be given to the intent of the water level monitoring and the selection of wells to be incorporated into the network. Selection of wells and monitoring requirements would be in accordance with the DCAP.

As recommended in the DCAP, selected lake and wetlands would be monitored to determine water level fluctuations, especially where lakes and wetlands are found to be in hydraulic continuity with ground water. Careful selection of monitoring sites may require some preliminary monitoring and evaluation.

The feasibility of conducting a pilot study using transducers to monitor water levels in specific areas in Island County has been discussed with Ecology staff. Ecology has expressed interest in assisting the County in designing a study and in training staff in using a transducer. A transducer is a highly specialized instrument hooked up to a microcomputer and placed in a well to monitor water level changes as they relate to tidal effects or pumpage. The details of a transducer study, including wells to be monitored and duration of study, have not been defined at this stage. To undertake this study, an official request should be drafted to Ecology defining the need and the proposed monitoring plan.

Environmental Impacts: No adverse environmental impacts are associated with implementing this strategy. An ongoing water level monitoring program in Island County will assist in preventing adverse environmental impacts associated with ground water limitations and quality degradation. The cost and time required to conduct water level monitoring and data management in the County may be appear to outweigh the immediate data results. Recent water resource investigations have not indicated long-term quantity trends (Sapik et al., 1988), suggesting that perhaps long-term trends are insignificant or that they may take many years of data collection to identify.

Strategy 2:

Failure of the GWMP to address the need to monitor water levels County-wide, especially in areas with confirmed or potential quality or quantity problems may lead to ground water quality deterioration and water shortages. Without more information on water level trends in the County, ground water development decisions may not adequately address ground water protection.

Environmental Impacts: The absence of an ongoing water level monitoring program in the County could result in adverse impacts to surface and ground water quality and quantity, and associated flora and fauna. The resultant water quality problems associated with water shortages may adversely impact environmental health.

Recommended Strategy: The GWAC recommends the implementation of an ongoing water level monitoring program County-wide, as outlined in the DCAP, focusing on areas with confirmed or potential ground water quality and/or quantity problems.

GROUND WATER USAGE MONITORING PROGRAM

Objective: Implement a water usage monitoring program in Island County, as outlined in the DCAP, to refine usage estimates and ensure ground water protection.

Background: Aside from the usage information collected by USGS and the ICHD, there is limited water use data available in Island County. DOH obtains some water use data from its Water Facilities Inventory (WFI), as reported by water system managers. However, this data is not retrievable for a period of more than a few years, and in some cases its reliability may be questionable. Presently, very few water systems and private wells have source meters.

Chapter 13.03A ICC (Revised 8/1/90) Minimum Standards for Water Works requires all new and expanding public water systems to install individually metered service lines. In addition, Chapter 8.09 ICC, Potable Water Source and Supply, requires a source flow meter be installed on each new potable water source at the well head, whether the system is public or private. Wells affected by these regulations should be considered for incorporation into the usage monitoring program.

A formal process designed to collect water usage data does not exist in the County. Ecology has the authority to require that all wells in Island County be metered.

Suggested Strategies:

Strategy 1:

Develop and implement a ground water usage monitoring program County-wide in order to refine usage estimates as defined in the DCAP.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

A ground water usage monitoring program should be developed in Island County to monitor long-term water usage trends and to ensure ground water protection. In some cases, volunteers from representative populations may be selected to assist in reporting usage figures (See Appendix I). Wells monitored would include

agricultural, commercial, industrial, public and private users from various geographic areas in the County. The monitoring network should follow the procedures outlined in the DCAP and attempt to address factors such as climate, user density, land uses, and development density.

Chapter 8.09 ICC metering requirement would assist in providing a greater variety of metered wells to be incorporated into the monitoring program. In addition, the County would seek funding to provide individual meters for monitoring stations selected for this project.

Relating the usage figures with population estimates for the represented uses will assist the County in refining existing usage estimates. Usage estimates, in conjunction with precipitation and evaporation estimates, will be valuable in the development of an improved water budget for Island County. The results of a usage monitoring project may also reflect the need for a more extensive evaluation of usage trends in the County to ensure ground water protection.

If results of the study indicate the need for more extensive water usage monitoring, the County should consider establishing a program to monitor usage and for all wells in Island County, beginning with public water systems. A comprehensive program would require ongoing usage data management.

Environmental Impacts: No long-term adverse environmental impacts will result from a usage monitoring study in Island County. This strategy promotes ground water protection by providing a means to collect and evaluate usage data for improved ground water development decisions. On the other hand, the cost of supplying meters to those participating in the study may be regarded as a financial burden and some may be reluctant to install a meter with fear that rates will be imposed in the future.

Strategy 2:

The absence of a organizational framework to collect and evaluate water usage data from metered wells in the County could result in ground water development decisions which do not adequately address ground water protection. Ground water usage figures have been obtained as County-wide estimates without the use of meters.

Environmental Impacts: Adverse environmental impacts could result if water usage in the County remains unmonitored and ground water availability decisions rely solely on existing usage estimates and other ground water information.

Recommended Strategy: The GWAC recommends the implementation of a County-wide ground water usage monitoring program in Island County, as outlined in the DCAP, to refine existing usage estimates and assist in ground water development decisions.

WATER QUALITY MONITORING

Objective: Implement an ongoing water quality monitoring program in the County, as described in the DCAP, to identify ground water quality problem areas and prevent additional quality problems in the future.

Background: Water quality sampling is presently underway in the County at both at the local and state level. The DOH/ICHD Salt Water Intrusion Policy requires chloride and specific conductivity sampling semi-annually for a number of public water system wells exceeding 100 mg/l chloride. Expanding and new public water system wells with chlorides exceeding 100 mg/l are required to sample for chlorides in April and August each year.

Semi-annual chloride monitoring of eight wells in Island County is presently being undertaken by the Health Department as part of an ongoing chloride monitoring program. Quarterly monitoring of twelve wells for organics and primary drinking water contaminants is presently being conducted at the Coupeville and Freeland landfills. These parameters are recorded in the ICHD and have not been entered into the GWMP data management system. Water quality sampling is also being conducted regularly at two NPL sites at NAS Whidbey Island. The ground water quality data generated from these sites can be obtained from NAS Whidbey environmental staff.

DOH has specific water quality requirements for public water supplies under the Rules and Regulations of the State Board of Health Regarding Public Water Systems (Chapter 248-54 WAC). In Island County, over 650 public water systems are currently reporting. DOH is responsible for ensuring Class I and II water systems conduct proper monitoring, whereas ICHD administers the portion of the state program pertaining to smaller public water systems (Class III and IV).

Drinking water samples from public water supplies are collected regularly for bacteriological and inorganic chemical and physical analysis. Turbidity, trihalomethanes, pesticides, radionuclides, and additional substances are also tested for regularly. This data is available from DOH and ICHD. If necessary, Ecology can require specific quality monitoring of certain wells.

Suggested Strategies:

Strategy 1:

Develop and implement an ongoing ground water quality monitoring program County-wide, as outlined in the DCAP,

focusing on areas requiring additional water quality monitoring.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

The overall goal of the water quality monitoring program is to identify contamination before it is too late to prevent serious and costly problems. Existing water quality monitoring required by local, state, and federal drinking water programs ensures drinking water is safe for human consumption; however, it is not designed to conduct ongoing monitoring of site specific quality parameters. It does not necessarily provide an accurate representation of site specific quality trends to the level required to identify sources of contamination.

A water quality monitoring program as outlined in the DCAP should be implemented. Water quality data generated from existing monitoring networks should be coordinated with GWMP data collection efforts. For GWMP efficiency, ultimately, all water quality data ought to be accessible from a centralized database.

Section V and VI of the DCAP outline water quality sampling needs and procedures. These sections should be referred to for specific quality assurance and quality control procedures to be followed.

USGS (Sapik et al., 1988) recommends that for bacteria and chemical constituents other than chlorides water samples be collected and analyzed from a dense network of wells in aquifers C, D, and E every 5 years. In between the 5 year sampling effort, water samples from a less dense network of wells should be analyzed for the same constituents. If a problem area is detected from the sampling program, a detailed study could be conducted.

Environmental Impacts: No direct adverse environmental impacts will result from the implementation of this strategy. However, the cost of water quality sampling and the additional effort involved in sampling and analysis may appear to outweigh the benefits of such an effort.

Strategy 2:

Without implementing an ongoing water quality monitoring program in the County, the ability to detect changes in chemical and biological characteristics of an aquifer is limited. Also, it may be argued that identifying contamination after it has reached a major public water supply well means that the contamination has been identified too late to prevent serious and very costly problems.

Environmental Impacts: Adverse impacts to water quality, environmental health, wildlife habitats, and flora and fauna may result if an ongoing water quality monitoring program is not established in Island County.

Recommended Strategy: The GWAC recommends Strategy 1 for implementation. The County should implement an ongoing ground water quality monitoring program County-wide, as outlined in the DCAP, to identify contaminant sources and long-term water quality trends.

WEATHER DATA COLLECTION

Objective: The weather data collection component of the DCMF is designed to assist the County in developing methodology to collect precipitation, evaporation, and transpiration data as outlined in the DCAP. These data will be used to develop a conceptual/theoretical model of the water budget in order to better refine ground water recharge estimates in the County. In addition, these data will assist in watershed management and planning efforts designed to protect ground water quality and quantity for existing and potential users.

Background: The WSU Cooperative Extension Office is presently managing a daily precipitation monitoring network consisting of 25 stations located throughout the County. Volunteers record precipitation and temperature daily and send monthly reports to the WSU Cooperative Extension Office. Evaporation and transpiration data to adequately evaluate these components of the water budget in the County is lacking. Existing evapotranspiration estimates have been indirectly obtained and do not reflect the specific vegetative cover in Island County.

Weather data collection strategies cover three areas - precipitation, evaporation, and evapotranspiration and vegetative cover. Strategies for each of these three areas is described below.

I. Precipitation

Suggested Strategies:

Strategy 1:

Implement a more extensive precipitation monitoring program in Island County, as identified in the DCAP, to assist in ground water development decisions and refine existing ground water recharge estimates.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

Precipitation is a major component of the hydrologic cycle affecting ground water recharge in Island County. However, precipitation data is lacking in many areas

and in some cases existing data conflicts with national data. Additional precipitation data is necessary to refine existing recharge estimates in Island County. A weather-net organization chart has been proposed as a possible organizational scheme to coordinate weather data collection (See Appendix H). This scheme is recommended for the implementation of all weather data collection components.

Environmental Impacts: No environmental impacts would result from the implementation of a precipitation monitoring network. A more refined evaluation of recharge in the County will help ground water management decision protect the resource from adverse environmental impacts in the future.

Strategy 2:

Failure of the GWMP to adequately address the County's need for refined evaluation of precipitation could result in ground water development decisions which fail to protect ground water recharge.

Environmental Impacts: Adverse environmental impacts could result if a precipitation monitoring network is not implemented in the County. The evaluation of recharge will remain based on County-wide estimates which may not adequately address ground water availability. However, additional staff time and effort devoted toward this effort may outweigh the benefits of precipitation monitoring.

Recommended Strategy: The GWAC recommends Strategy 1 for implementation. The development of an improved precipitation monitoring network County-wide is essential for the proper management of Island County's ground water resources.

II. Evaporation

Suggested Strategies:

Strategy 1:

Implement a pan evaporation monitoring network in Island County, as recommended in the DCAP, to improve recharge estimates.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

The measurement of evaporation from pans is considered one of the easiest and most accurate ways of estimating evaporation from a "free water surface" (USGS, National Handbook of Recommended Methods for Water Data Acquisition, Chapter 8, 1982).

No pan evaporation stations presently exist in Island County. Preliminary discussion with members of the SCS and NOAA on the value of pan evaporation measurements in estimating evaporative losses for use in recharge estimates have indicated a number of difficulties with using this method in a region with a humid climate. Many factors need to be taken into account when selecting a pan evaporation station location, including humidity, temperature, wind, and soil types. Pan evaporation has been mostly used for irrigation purposes in arid regions when attempting to grow plants at the peak rate.

Initial efforts to evaluate evaporation should consist of two pan evaporation stations in areas of extreme climate conditions for Island County, preferably near precipitation stations and on both Camano and Whidbey Islands. Daily measurements of temperature and humidity, and observations of wind conditions and any other pertinent factors should be made. Data from the two stations should be compared and evaluated closely.

Environmental Impacts: There are no environmental impacts associated with the implementation of this program. The additional cost and time required to implement this strategy may appear to outweigh the benefits.

Strategy 2:

The absence of a means to measure evaporation in the County will not assist the County in improving ground water recharge estimates. Because of the significance of evaporation as a component of the water budget, evaporation estimates will remain generalized and ground water recharge estimates unrefined.

Environmental Impacts: If ground water availability estimates do not accurately reflect conditions in the County, ground water development decisions based on these estimates may not adequately protect the resource

and adverse environmental impacts may result.

Recommended Strategy: The GWAC recommends Strategy 1 for implementation. This strategy represent an initial effort to improve the County's understanding of evaporation as a component of the water budget.

III. Evapotranspiration and Vegetative Cover

Suggested Strategies:

Strategy 1:

Research and evaluate the relationship between evapotranspiration and vegetative cover in Island County to improve existing recharge estimates.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

Very little is known about the evapotranspiration potential of existing vegetative cover, nor does an inventory of vegetation exist in the County. In certain areas, a considerable amount of precipitation may be intercepted by the foliage, limiting the amount of water available to recharge the aquifers.

Evapotranspiration is the term used to refer to the processes of evaporation and transpiration occurring in areas where the land surface is composed of both vegetative cover and bare soil. As a critical component of the water budget, evapotranspiration estimates need to be improved to reflect existing conditions in Island County. A review of the existing literature on this subject may be useful in generating estimates of the relative evapotranspiration potential for the following surfaces:

- o impervious
- o grass
- o deciduous trees (i.e. alder)
- o evergreen conifers (i.e. douglas fir)

An interim water balance formula reflecting evapotranspiration of the various vegetative covers should be developed. This formula will provide a basis

for evaluating evapotranspiration impacts on recharge estimates when making development or ground water development decisions based on water budget analysis.

Once a literature search of evapotranspiration has been completed, the County may consider hiring a contractor or additional staff to assess vegetative cover through aerial photography, remote sensing, or other accepted technique.

Environmental Impacts: No direct adverse environmental impacts will result from implementing this strategy. In some respects, the cost and time required to implement this strategy may appear to outweigh the benefits.

Strategy 2:

The absence of an effort to improve evapotranspiration estimates in the County to reflect vegetative cover may result in ground water development decisions which do not adequately address ground water protection. Precipitation data alone does not adequately reflect ground water recharge in an area.

Environmental Impacts: Although this strategy may be a cost and time saving approach, adverse environmental impacts, relating to water quality and quantity, may result if ground water recharge estimates which do not adequately reflect evapotranspiration are used as a basis for ground water development decisions.

Recommended Strategy: The GWAC recommends Strategy 1 for implementation. Evapotranspiration is a critical component of the water budget in Island County. Established data and existing literature on this topic should be reviewed and evaluated to assist in ground water and watershed planning efforts.

RUNOFF DATA COLLECTION

Objective: Select and evaluate artificial and natural discharges in critical watersheds in Island County to improve runoff estimates and to assist in defining areas of potential recharge.

Background: Limited runoff data is available in the County and no known gauging stations are presently active. In the Island County Coordinated Water System Plan (1990) recharge analysis based on existing data estimates runoff of 0 to as much as 10 percent of precipitation. USGS (Sapik et al., 1988) measured discharge from springs on both Whidbey and Camano Islands; however, discharge below sea level was not measured.

The Island County Watershed Ranking Report (December 1986) ranks eight of the top priority watersheds and watershed groups in the County. These watersheds were selected based on the existing or potential contributions of nonpoint source pollution to Puget Sound waters.

Suggested Strategies:

Strategy 1:

Implement a runoff data collection and monitoring program to improve runoff estimates and to assist in watershed management and planning efforts in Island County.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

The determination of the quantity of precipitation or ground water lost by runoff is critical in refining recharge estimates in Island County. Discussion with ICED staff has indicated a possible interest in coordinating efforts to evaluate runoff. Pursuant to the Stormwater Master Plan, the County Engineering Department is planning to conduct a facilities drainage inventory and will be drafting a drainage map for the County. One of the purposes of the inventory is to prepare for future changes in runoff as is necessitated by the predicted population growth trends, especially in critical and urbanized areas.

Runoff evaluation could consist of selecting several critical watersheds, as identified in the Watershed Ranking Report, for refined hydraulic analysis. Daily measurements of stream and artificial runoff are recommended for a two year minimum. Various methodologies for runoff measurements are outlined in Appendix F in the DCAP. The preferred methodology will depend on the characteristics of the flow measured.

Environmental Impacts: No environmental impacts are associated with the implementation of this strategy. Efforts to improve the County's assessment of runoff will allow for better management of the resource.

Strategy 2:

The absence of efforts to evaluate artificial and natural runoff in the County could result in land development which does not adequately promote ground water recharge and protect ground water from contamination. Recharge estimates reflecting existing runoff data may not adequately reflect ground water availability in an area.

Environmental Impacts: Adverse environmental impacts may result from the implementation of this strategy. If no efforts are dedicated toward improving runoff estimates, ground water development decisions based on recharge estimates may not adequately protect ground water quality and quantity.

Recommended Strategy: The GWAC recommends Strategy 1. The GWAC wants to ensure that runoff data is collected as part cooperative efforts between water resources and Engineering Department staff.

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ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #6

Title: Ground Water Development Classification Matrix

Problem Statement: No objective and realistic criteria have been developed to evaluate ground water impacts resulting from development of a new well or from additional withdrawals in Island County.

Objective: To develop a consistent and objective set of criteria for classifying ground water impacts associated with developing new wells or permitting additional withdrawals in Island County in order to avoid potential adverse impacts to ground water quality and quantity from potential or existing users.

Existing Policies and Programs: Ground water availability has not been specifically quantified for the Island County Ground Water Management Area. Preliminary assessments of ground water resources and their potential for supporting additional development were performed both as part of the CWSP and the GWMP Hydrogeologic Characterization. These evaluations of ground water availability were designed to serve as the basis for initial ground water planning and water use and to provide a general understanding of the components of recharge, ground water use, and natural discharge. However, estimates alone can not be used for accurate long-term management of ground water resources.

Current public water system withdrawal proposals are evaluated in accordance with the DOH/ICHD Salt Water Intrusion Policy. Pumping test and water quality analysis results provide site specific information of the proposed withdrawal.

The GWMP Policy Analysis contains a sample matrix of weighted risk factors for seawater intrusion. Although certain factors in this matrix may not be realistically obtained or measured for ground water availability determination in Island County (i.e. aquifer transmissivity and annual recharge), this matrix was designed to be used as an initial guide in developing criteria to be used to support local decisions affecting ground water in Island County.

Suggested Strategies:

Strategy 1:

Develop the Ground Water Development Classification Matrix and an accompanying regulatory framework for its implementation.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

The proposed Island County Ground Water Development Classification Matrix (See attachment to this option paper) will be used to assist the County in:

- (1) standardizing the process used in determining the potential adverse impacts of new wells or additional withdrawals on the overall hydrogeologic system;
- (2) guiding well development, especially in areas experiencing water quality or quantity problems relating to seawater intrusion;
- (3) further defining areas which have ground water quality and/or quantity problems;
- (4) characterizing wells in terms of hydrogeologic parameters and generating reproducible results.

The matrix is used to determine whether the appropriate permit associated with a proposal should be issued or if planned aspects of the well should be changed to avoid possible adverse impacts. The matrix consists of a series of factors that affect the well's impact on existing wells and the overall hydrogeologic system. These factors could include, but are not limited to: distance to seawater, static water level, pumping water level, geographic location, pumping rate, completion elevation, water quality, infiltration potential, and number of wells in the surrounding area.

A well development proposal will be classified into a low, medium, or high risk category depending on the relative rating of each of the factors. An evaluation of aquifer parameters should be required for

wells in medium and high risk areas. If a well is found to pose a high risk of adversely impacting the existing hydrogeologic system, changing one or more of the factors may shift the well into a lower category. Changes may include tapping a different aquifer zone, lowering the pumping rate, moving the well inland.

The matrix will serve to refine existing data and eventually provide support for the delineation and mapping of areas which require special ground water protection, such as critical areas pursuant to the Growth Management Act. Information gathered through the Data Collection and Management Program and any other ground water monitoring efforts will also be considered in the overall classification of a well.

Well classification should result from the use of the best available knowledge and should provide for adaptability as additional data is collected and as the understanding of aquifer behavior is improved. Criteria should include water quality analysis, any additional testing necessary to adequately characterize the well potential, and if possible, careful monitoring of surrounding wells during and after the pumping test to observe drawdown over time and recovery rates.

The classification matrix will assist the County in collecting data which can be used to design a well test which best reflects site specific characteristics. A well test should satisfy minimum requirements by all agencies and must adhere to the requirements of the County/DOH Salt Water Intrusion Policy. Ecology is in the process of drafting a State Seawater Intrusion Policy which applies to both public and private water systems. Additional water quality and quantity testing should be required based on regulatory requirements and risks of seawater intrusion.

A well test should be conducted whenever a new well is constructed or when a water right application to increase a withdrawal quantity is filed. The test design should be consistent with the aquifer test protocol for use in Island County which is to be developed by Ecology and Island County pursuant to the MOU (See option paper #20). The test results should be used to supplement information gathered in the matrix for a comprehensive evaluation of the proposed withdrawal.

Environmental Impacts: No immediate adverse environmental impacts are associated with the

implementation of this strategy. The matrix will assist the County in evaluating new wells and withdrawals which may potentially affect ground water. However, some development decisions based on the matrix could potentially impact ground water. In addition, the implementation of the matrix could result in increased economic burdens on some applicants.

Strategy 2:

The absence of a method to objectively evaluate well development proposals and additional withdrawals and to maximize the use of ground water data available may result in decisions which do not adequately address ground water protection.

Environmental Impacts: Implementation of this strategy may result in adverse environmental impacts, including ground water contamination and shortages, and public health problems. In addition, economic impacts may result from inadequate testing and evaluation of proposed well development.

Recommended Strategy: The GWAC recommends Strategy 1 for implementation. The GWAC will contribute to the development of the Ground Water Development Classification Matrix so that it best reflects the confirmed and potential ground water problems identified in the County. A policy framework or ordinance should be established to make the matrix effective.

References:

Economic Engineering Services, Inc., 1990, Island County Ground Water Management Plan Policy Analysis.

Hart Crowser Inc, 1987 Coordinated Water System Plan Groundwater Resource Evaluation, report J-1939.

Memorandum of Understanding between Washington State Department of Ecology, Water Resources Program & Island County, Washington, December 1990.

SHB 2929, Growth Management Act, effective July 1, 1990.

State of Washington Department of Health/Island County Health Department Salt Water Intrusion Policy for Public Water Systems, July 1989.

GROUNDWATER DEVELOPMENT CLASSIFICATION MATRIX VERSION: DECEMBER 24, 1990

FACTOR NUMBER*		DISTANCE TO SEA WATER											
PERCEIVED SENSITIVITY	QUANTIFIED SENSITIVITY VALUE	1	2	3	4	5	6	7	8	9			
		STATIC WATER LEVEL (ft msl) (If Dist <2000ft) If Dist >2000ft	STATIC WATER LEVEL (ft msl) (If Dist <2000ft) If Dist >2000ft	PUMPING WATER LEVEL (ft msl) (If Dist <2000ft) If Dist >2000ft	PUMPING WATER LEVEL (ft msl) (If Dist <2000ft) If Dist >2000ft	PUMPING RATE (gpm)	COMPLETION ELEVATION (ft msl)	CHLORIDE CONCENTRATION IN AREA (mg/l)	POTENTIAL EXISTING WITHIN AREA (ft msl)	NUMBER OF EXISTING WITHIN AREA (ft msl)			
HIGH	3	<2000	<10	<15	<5	<10	POINT	<5	>200	HIGH			
MEDIUM	3	2000-6000	0-10	10-20	5-10	10-20	ISTHMIUS	5-20	5-50 OR BELOW -250	100-200			
LOW	1	>6000	>10	>20	>25	>10	UNCLASSIFIED	<5	>50	<100			
NOT APPLICABLE	0	[.....USE ONE ONLY.....]											
PROCEDURE:													
1) ENTER:													
"QUANTIFIED SENSITIVITY" TO RIGHT													
2) CALCULATE:													
"WEIGHTING FACTOR" (LISTED TO RIGHT)													
3) CALCULATE:													
"RELATIVE EFFECT" (PRODUCT OF ABOVE)													
4) GENERATE:													
"OVERALL RATING" (SUM OF RELATIVE EFFECTS)													
Total of Relative Effects													

*NOTE: SEE TEXT FOR HOW TO SELECT DATA FOR EACH FACTOR IN THE MATRIX
POSSIBLE RANGE: 11-115
Developed by Pacific Environmental Group in conjunction with Inland County Planning and Health Departments

USER'S GUIDE

ISLAND COUNTY GROUND WATER DEVELOPMENT CLASSIFICATION MATRIX

The following user's guide describes how to select and input data for the Ground Water Development Classification Matrix. Through the use of this matrix, the relative impact of a new well is classified into one of three categories based on nine factors that can be estimated or measured from existing and site-specific data. The classification can then be used in deciding whether the appropriate permits associated with the project should be issued or whether planned aspects of the well should be changed to reduce the potential impact.

PURPOSE

The main purpose of this matrix is to allow a trained professional to classify, in a consistent and unbiased manner, the overall risk resulting from development of a new well. Classification into a low, medium or high risk category helps the user to assess whether the proposed well is consistent with ground water policy in a given area. For example, the county may have decided that a building permit will not be granted in a certain area if a "high risk" well is to be used. The matrix allows the user to assess whether the new well poses a high risk to the existing hydrogeologic system.

A secondary purpose of the matrix is to guide well development, especially in areas experiencing water quality or quantity problems relating to salt water intrusion. For example, if a proposed "high-risk" well is rejected in a certain area, changing one or more of the factors may shift the well into a lower category, e.g. such as tapping a different zone, pumping at a lower rate, moving the well inland. The new well configuration could pose lower risk to the hydrogeologic system and may therefore be allowed.

The use of the matrix allows consideration of nine factors that affect the well's impact on existing wells and the overall hydrogeologic system. Ideally, the hydrogeologic system would be known with enough detail to quantify the effects through calculations or the use of a model. Such a quantification is the preferred method to assess hydrologic impacts. In Island County, such quantification is not possible because the system is not completely understood. Instead, the accompanying matrix can be used to rate the relative effects of each of the factors and generate a score that indicates the overall classification (high, medium or low risk) and thereby give a general indication of the potential to impact the overall system.

The matrix in effect allows the use of "best professional judgement" in a consistent and reproducible way. Data from areas experiencing water quantity and quality problems were assessed and compared with data from areas where development is not causing noticeable or measurable degradation of the environment. Averages (both means and medians) were generated for both "problem" and "non-problem" areas¹. These were compared and differences were noted. General values (for example distances from the "sea"² within which saltwater intrusion has typically occurred, well completion elevation, etc.) were estimated. These estimates were then used to set the limits of the three categories for each factor used in the matrix. By using a consistent set of values for each factor, a well is assigned to a category based on the actual data and not just arbitrarily assigned based on the "gut feeling" of the evaluating hydrogeologist.

LIMITATIONS

The matrix has several limitations. First of all, it does not evaluate or quantify the actual hydrologic effects of a new well on the existing hydrologic system. It only ranks the well and places it into a category indicative of how the well is likely to affect the system. A calibrated computer model of the ground water system would be needed to actually quantify impacts to the system.

A second limitation is that the divisions between the categories are estimated based on existing data. The results are not absolute. New data collected over time may require changes in the values for each category, development of new or different factors, or shifting of the relative weighting of each factor in order to keep the matrix current. For example, continuous development of new wells will eventually overdraft a given area as it can only sustain a finite amount of ground water development. Even if all new wells were placed in the "low-risk" (as defined today) category, the total allowable limit from an area will eventually be exceeded. However, changing the values of various factors to reflect the changing situation, could limit or stop development. For example, the county may decide that for certain areas only wells in the low-risk category are approved. In some situations the conditions and matrix values may make only medium or high-risk wells possible. Ground water development in this area would likely stop.

A third limitation is that the matrix requires some hydrogeologic skills to properly input data. The skills required include selection of appropriate values and some limited calculations. The lay-person may not be able to use the matrix without guidance from a qualified hydrogeologist.

The final limitation is that only wells can be evaluated. This matrix cannot rank the relative category of other types of development beyond well placement. Clear-cutting, housing developments, shopping malls or any other type of development cannot be assessed with this matrix.

METHOD

The following instructions indicate how to use the Ground water Development Classification Matrix. These instructions are based on the assumption that the user is familiar with the general hydrogeology of Island County, the GWMP Part A Technical Memorandum, the Island County Well database and general hydrogeologic terminology.

General Procedure

The general procedure for use of the matrix is to select a "quantified sensitivity value" for each of 9 factors considered in the matrix. This value (0, 1, 3, or 5) is based on physical data for the proposed well. Each of these values is multiplied by a weighting factor (indicating the relative importance of the factor on the overall rating). Each of these products is added and the overall rating is translated into a risk category based on the total rating score. A total of less than 70 is classified as "Low Risk." A score of 70 to 105 is classified as "Medium Risk" and a score of greater than 105 is classified as "High Risk." The calculations for this matrix can be performed by hand or entered into the Lotus 123tm spreadsheet provided.

The method for selecting the input data for each factor is discussed below. In many cases, several methods are available. In each case the first method is more accurate and preferred to the second. The second method is preferred to the third and so forth. Subsequent methods are less accurate and involve more estimation. We have incorporated an element of conservatism such that estimated data are more likely to be biased toward the higher risk categories. This conservatism is meant to encourage the use of actual field data. These data may be based on a nearby existing well or may require the drilling of a "test well." In most cases, a "test well" can become the production well if the well is approved.

In two cases (static water level and pumping water level), the method used to select the quantified sensitivity value depends on the distance of the well from seawater. For these factors, only one of the three sets of choices is used in the matrix analysis. For example, if the well is to be located 1500 feet from the coast, a value of "0" is entered for the choices in the 2000 to 6000 and >6000 feet categories.

Distance to Seawater

Purpose: To locate the well away from likely salt water intrusion areas, minimize the impact of the well on down-gradient wells by moving the drawdown "cone of depression" away from near-shore wells that may already be experiencing salt water intrusion, and move the down-gradient stagnation point³ inland from the salt water interface.

Procedure:

- 1) The proposed well is surveyed and located on a USGS topographic map of the county (or one with better detail). The distance to the nearest body of "seawater" (sound, straight, inlet, bay, etc.) is directly measured.
- 2) The proposed well location is approximated on a USGS topographic map of the county (or one with better detail). The distance to the nearest body of "seawater" (sound, straight, inlet, bay, etc.) is directly measured. Ideally, the well location is verified by the county.

Static Water Level

Purpose: To locate the well in areas where the existing static water level is less likely to be conducive to salt water intrusion.

Procedure:

Choose the appropriate column in the matrix for static water level input based on distance of the well from seawater. Then choose one of the following procedures:

- 1) Static water level is measured in the actual well under consideration. Depth to water is measured from the well head with an electric sounder, steel tape, to the nearest 0.1 foot. The static water level elevation is calculated by subtracting depth to water from the elevation of the well head based on survey, calibrated altimeter capable of measuring to within 5 feet, or careful estimation using a topographic map (contour elevation 20 feet or better). In the case of an estimate based on altimeter or topographic map, the well should be carefully field located and 5 feet subtracted from the elevation as a safety factor to help account for possible error for the lesser error inherent in the method (in comparison with survey methods).

or

- 2) Static water level is measured in a well near to (within 500 feet) and finished at the same elevation (within 25 feet) as the proposed well. Depth to water and static water level elevation are calculated as described above. A safety factor of 20 feet should be subtracted from the calculated elevation to help account for possible error in using data from a nearby well that may be finished where water levels are higher.

or

- 3) Static water level is estimated from existing reports, Island County records (Health Department files or data base) for wells near to (within 500 feet) and finished at the same elevation (within 25 feet) as the proposed well. Depth to water and static water level elevation are calculated as described above. A safety factor of 30 feet should be subtracted from the calculated elevation to help account for possible error in using data from wells that may have higher water levels.

or

- 4) Static water level is estimated based on well completion elevation (elevation of the lowest part of the well or well screen) plus 10 feet. Well completion elevation is estimated as described below.

NOTE: All "static" water elevations vary seasonally. Water levels in Island County during fall and early winter are typically 5 to 20+ feet below those of spring. A conservative approach would be to base all decisions on fall data. A safety factor of 5 to 10 feet or more could be subtracted from all spring measurements, if desired.

Pumping Water Level

Purpose: To maintain pumping water levels at an elevation that is less likely to induce salt water intrusion in the new well and existing wells. Higher water levels are needed inland to maintain flow toward coastal areas where inflow of fresh ground water is needed to maintain the position of the salt water interface.

Procedure:

Choose the appropriate column in the matrix for pumping water level input based on distance of the well from seawater. Then choose input values for that column.

All pumping water levels are based on either a commitment to control pumping water level by placing the well pump at a

surveyed elevation (the preferred method), or a calculation to estimate the approximate water level.

If a pumping water level is estimated the following formula is used:

Static Water Level - Pumping Rate/Specific Capacity = Pumping Water Level

Static water level is assessed as described above. Pumping rate is based the method discussed below in a following section. Specific Capacity is the ratio of pumping rate (gpm) divided by drawdown (ft), based on one of the following methods.

- 1) Specific capacity is measured during a pumping test in the actual well under consideration. The average pumping rate during the test divided by the maximum drawdown during the test is equal to the specific capacity. If the test duration is less than 24 hours, then the specific capacity is multiplied by 2/3 as a safety factor to help account for decrease in specific capacity that occurs during longer pumping periods.

or

- 2) Specific capacity is based on an average of the values reported in the GWMP Part A Technical Memorandum for wells within 2000 feet of the site, finished at a similar altitude to that of the proposed well. This average specific capacity is multiplied by 1/2 as a safety factor to help account for possible errors and non-representative wells used in the average.

or

- 3) Specific capacity is based on the median value reported for the county multiplied by a safety factor of 1/4 to help account for possible errors and non-representative wells used in the average. Data in the Part A Technical Memorandum can be used as an indicator of the median value. The median times 1/4 in the Part A report is approximately 0.25 gpm/ft for the "C" and "D" aquifers.

Geographic Location

Purpose: To locate the well away from areas where salt water intrusion is more likely because of the narrowing of the land mass.

Procedure:

Select the type of geographic location based on the following:

Point: If the proposed well lies within 2000 feet of salt water on a line in any direction, and it also lies within 2000 feet of salt water on a line at 90 degrees to the first line, and it also lies within 2000 feet of salt water on a line at -90 degrees to the first line or 90 degrees to the second line, the well lies on or near a point.

Isthmus: If the proposed well lies within 2000 feet of salt water on a line in any direction, and it also lies within 2000 feet of salt water on a line at 180 degrees to the first line, the well lies on or near an isthmus.

Unclassified: If the proposed well does not meet either the criteria for a point or isthmus, it is unclassified.

Pumping Rate

Purpose: To pump the well at lower rates such that water conservation and multiple-well systems (verses single wells pumping at higher rates) are encouraged.

Procedure:

The pumping rate used in the matrix is equal to the maximum instantaneous pumping rate of the installed or to-be installed pump based on pump rating curves, manufacture's rating, or well test using the pump to be used for long-term production. Well tests shall follow:

- 1) DOH requirements for new and previously unapproved well sources, or
- 2) DOH sizing guidelines for Public Water Systems and Chapter 13.03A ICC Minimum Standards for Water Works

Completion Elevation

Purpose: To complete wells in zones that are less frequently developed and less likely to experience seawater intrusion.

Procedure:

Select one of the following:

- 1) Completion Elevation is measured in the actual well under consideration. Well completion elevation is based on well head elevation (based on survey, altimeter or careful estimation using a topographic map with contour elevation 20 feet or better) minus depth of the lowest

part of the well boring or well screen. In the case of estimation based on a topographic map, the well should be carefully field located and 5 feet subtracted from the estimated elevation as a safety factor to help account for possible error in interpretation using topographic maps (compared to survey methods).

or

- 2) Well completion elevation is estimated before well is constructed from topographic maps (as described above) minus depth of the lowest part of the well boring or well screen. A safety factor of 10 feet is subtracted from the estimated completion elevation to help account for possible error.

Chloride Concentration in Area

Purpose: To locate wells outside of areas already experiencing salt water intrusion.

Procedure:

Chloride concentration is calculated based on the method described in the Island County Salt Water Intrusion Policy. The "Risk Categories" (page 3 and 4 of the document) shall be used.

Infiltration Potential at Site

Purpose: To locate wells (and their associated developments) in areas less likely to contribute to ground water recharge.

Procedure:

The well is located on a topographic map. The location is compared with the "Infiltration Potential" maps included in the Part A Technical Memorandum for the GWMP as indicated in Exhibits II.2-1 through 4 pages, II-55 through 58). The infiltration potential as indicated on the maps is entered into the matrix.

Number of Well Users in Area

Purpose: To locate wells in areas less developed thereby encouraging less dense ground water development.

Procedure:

The Island County Database is used to identify all the wells in the one square mile surrounding the proposed well. The state plane coordinates of the well are identified from

the proposed well location. The rectangle surrounding the well (with the well at the center) is identified in the data base and all wells are identified and counted. This number is entered into the matrix. If part of the one square mile rectangle lies off shore (with the well at the center of the rectangle), then the boundary or boundaries of the rectangle are shifted such that they lie on, or approximately on, the coast.

If one or more actively used irrigation wells lie in the square mile, the proposed well is entered into as a "high sensitivity" for this factor. Irrigation wells are identified through Ecology's water rights files or by field identification on a site reconnaissance.

FOOTNOTES:

1. In this matrix "problem areas" include the Focus Areas as discussed in the "Ground Water Management Plan Part A Technical Memorandum" prepared by EES and Pacific Ground Water Group in 1989, and "seawater intrusion areas" and "water level below sea level areas" as noted in the "Appendix A, Coordinated Water System Plan, Ground Water Resource Evaluation" prepared by Hart Crowser, Inc in 1987. Non-problem areas include the remainder of the county.
2. In this report we have used the generic term "sea" to indicate a body of marine water such as Puget Sound, Admiralty Inlet, the Straits of Juan de Fuca, Saratoga Passage and all other connecting straits, inlets, passages, and bays.
3. The stagnation point is the position downgradient from a pumping well where the gradient toward the well caused by pumping is equal to and canceled by the natural flow gradient of the ground water system. At this point, a drop of water does not move. Water on the well side of the stagnation point flows towards the well. Water on the other side of the stagnation point flows towards the sea. If the salt water/freshwater interface is downgradient from the stagnation point, the interface will not flow inland toward the well. If it lies between the well and the stagnation point, it will move toward the well and seawater intrusion will progress. For further discussion, see Hydraulics of Groundwater by Jacob Bear, pages 379-435, published by McGraw-Hill.

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #7

Title: Ground Water Availability Criteria: Potable Water Source and Supply (ICC 8.09)

Problem Statement: Prior to the adoption of Chapter 8.09 ICC Potable Water Source and Supply as County ordinance (September 1990), no codified guidelines existed to ensure that "adequate" water was available (ICC 8.07B), nor had the County defined what constituted "appropriate provisions" for potable water supplies (ICC 16.17). With specific ground water availability guidelines now in place in the County, some of the GWAC's initial concerns have been addressed. However, questions remain about:

- o the role of the Ground Water Development Classification Matrix in ICC 8.09 implementation;
- o the 400 gallon per day (gpd) minimum well yield requirement;
- o the adequacy of a one-hour minimum pumping test for individual water systems, and;
- o the provision which exempts applicants proposing individual water systems on subdivisions in which all lots are 2.5 acres or greater from having to drill a test well.

Objective: Coordinate the administration of the Ground Water Development Classification Matrix (option paper #6) with ground water availability requirements in ICC 8.09. Recommend specific changes to ICC 8.09 to strengthen its requirements for providing evidence of adequate ground water availability for individual water systems and all subdivisions.

Existing Policies and Programs: The Growth Management Act (GMA; SHB 2929) has taken an important first step towards the goal of managing ground water resources in some of the State's fastest growing counties, including Island County. The bill became effective on July 1, 1990. Section 63 of the Act modifies the State Building Code to require that an applicant for a building permit for any building requiring potable water provide evidence of an adequate water supply for the intended use. Furthermore, Section 52 of the GMA requires that "appropriate provisions are made for...public

water supplies" prior to approval of subdivisions.

To implement Sections 51, 52, and 63 of the GMA at the County level, the BICC adopted ICC 8.09 as County ordinance on September 17, 1990.

As written, Chapter 8.09 ICC applies to building permits issued for buildings requiring potable water, and to proposed subdivisions in Island County, with the exception that applicants proposing subdivisions for which individual water systems are proposed, and where each resulting parcel is 2.5 acres and greater, are not always required to drill wells to determine water quality or quantity. An ICHD approved plot plan, well site approval, and provisions for a sanitary control area are required for these subdivisions. Also, additional information may be required as deemed necessary by the Health Officer. For example, in areas with existing elevated chloride levels or indications of primary contaminant levels in excess of maximum contaminant levels, applicants for well site approval are required to drill test wells and results of water quality analysis.

Suggested Strategies:

Strategy 1:

This strategy consists of the following components:

- A. Create and adopt a County policy consistent with ICC 8.09, Portable Water Source and Supply, providing for use of the Ground Water Development Classification Matrix in evaluating new wells.
- B. Insert a new ICC 8.09.050.C.2 as follows:
"An estimation of the maximum anticipated peak day demand of the proposed development; and"...
- C. Revise ICC 8.09.020.A as follows:
"Adequate water supply means a water supply which 1) is capable of supplying at least 400 gallons of water per connection per day for indoor use, 2) is capable of meeting the maximum anticipated peak day demand of the proposed development, and 3) meets siting criteria established by State and local regulations."
- D. Revise the existing language at ICC 8.09.050.C.3 as follows:

"The written results of a bailer test, or air lift test,

or pump test, any of which is performed for a minimum of ~~one~~ four hours, verifying a minimum well yield ~~of 400~~ gallons per day meeting the maximum anticipated peak day demand of the proposed development. Such minimum well yield shall be at least 400 gallons per day to meet the indoor water use requirements of the proposed development; and..."

- E. Renumber the remaining items under ICC 8.09.050.
- F. Review the State Seawater Intrusion Policy classification criteria for adequacy in addressing seawater intrusion risks associated with individual water systems. Adopt State criteria or develop local criteria for individual water systems located in high, medium and low risk categories pursuant to the Island County/DOH Salt Water Intrusion Policy for public water systems.
- G. Delete 8.09.060.B.2(g).

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

- A. Where ICC 8.09 provides guidelines defining what constitutes ground water availability in the County, the Ground Water Development Classification Matrix (option paper #6) can assist in evaluating the potential for adverse impacts to ground water quality and quantity related to ground water withdrawals. The matrix can be used in conjunction with the provisions of ICC 8.09 to assist the County in making ground water development decisions which minimize adverse environmental impacts. Specific policy language linking the matrix to the administration of ICC 8.09 should be drafted and adopted if this strategy is adopted.

Because of staff and funding limitations, the ICHD has indicated that preliminary use of the matrix will be limited to public water systems and all subdivisions. With existing resources, a detailed evaluation of individual water systems would create significant additional work for existing ICHD staff.

The GWAC feels that if the matrix proves to be a useful tool, it should be used to classify all new ground water

withdrawals in Island County, including all new individual withdrawals. Although the GWAC recognizes the resource constraints which presently exist in the County and the additional workload which would result from additional review, all ground water withdrawals, including individual water systems, may contribute to potential adverse ground water impacts to water resources in the County, and therefore, the GWAC feels that all new withdrawals should be subject to the most thorough evaluation possible.

The State Seawater Intrusion Policy (draft) presently outlines requirements for new and existing domestic wells in areas where seawater intrusion has been documented. The matrix is designed to address only new withdrawals. When the State policy is approved, and if new domestic well withdrawals are adequately addressed, use of the matrix to classify domestic wells may not be necessary. On the other hand, if the State policy does not adequately address domestic withdrawals, the GWAC may recommend that the matrix be used to classify domestic wells at least in areas of existing ground water problems, and possibly throughout the whole County.

- B. Materials needed for a building permit include blueprints and other drawings. Information in these materials include number of bedrooms, location and number of plumbing fixtures (standards for plumbing fixtures are provided in the State Plumbing Code - see option paper #4), and other information sufficient to make an estimate of the anticipated peak day usage for the building. Some idea of outdoor water use can also be estimated.

Instructions to calculate this estimate will be provided with other application information provided to the applicant. This additional requirement in ICC 8.09 would not create a significant burden on the applicant, and will facilitate the design of a site specific well test, of a duration which better reflects anticipated demands for the proposed development.

- C. Despite the fact that few individual water systems have yields so low as to create a health risk during peak day demands, the use of this language to define "adequate water supply" would ensure that wells drilled in the future meet anticipated peak day demands, and would eliminate any concerns over the adequacy of the 400 gallon per day minimum requirement. The 400 gallon per day requirement is based on indoor use only, and in many

cases may not be adequate for peak day use.

- D. The specific language added to the requirements for building permits for individual water systems, not requiring a water right, will enable ICHD staff to better characterize proposed wells and to evaluate their potential ground water quality and quantity impacts on neighboring wells. The adequacy of a one-hour pump test is questionable; a four-hour test is more appropriate given the susceptibility of some areas to seawater intrusion and the lack of ground water information. In addition, requiring the proposed well to meet maximum anticipated peak day demand will ensure that the water supply needs of the applicant can be met, even when demand is greatest. Because minimum requirements for public water systems are adequately addressed in State and local code, this specific language shall apply only to individual water systems.
- E. This is a "housekeeping" item.
- F. ICC 8.09 specifies that additional information may be required by the health officer before individual water system approval. Although no specific criteria is provided in the code as to what additional requirements may be imposed, individual water systems are classified into a low, medium or high risk category very similar to those identified in the Island County/DOH Salt Water Intrusion Policy for public water systems. ICHD conducts an evaluation of existing ground water quality and quantity data and considers site specific factors which may indicate the need for additional information.

Individual water systems proposed in areas with wells experiencing seawater intrusion (e.g. Focus Areas) may be required to conduct additional quality and quantity testing to better characterize ground water availability. Additional requirements may include a 24 hour pumping test, water conservation, water use restrictions, and additional water quality monitoring and reporting. Although specific requirements for individual water systems which fall in the high, medium or low risk categories have not been defined at the County level, the State Seawater Intrusion Policy (Draft) includes risk classification criteria for individual water systems which address these concerns. These criteria should be considered for adoption at the County level once the State policy is adopted or local requirements should be established.

Use of the Ground Water Development Classification

Matrix for evaluating individual water system withdrawals proposed in areas requiring special ground water protection will assist the ICHD in their ground water availability determination.

- G. Removing the language that exempts proponents of certain subdivisions from having to drill test wells in all cases will provide protection to potential buyers of the property, and will minimize economic losses to land buyers resulting from the purchase of "undevelopable" land. Removing the exemption will, however, place an economic burden of drilling test wells on applicants for subdivisions.

Environmental Impacts:

No adverse environmental impacts are associated with linking the Ground Water Classification Matrix with ICC 8.09 to better evaluate ground water availability. No immediate environmental impacts are associated with using information collected through the Ground Water Development Classification Matrix to supplement ICC 8.09 ground water availability requirements. An estimate of the anticipated peak day demand will allow well design test design to better reflect specific site characteristics, thereby providing increased protection of ground water resources through realistic characterization of actual withdrawal amounts. No adverse environmental impacts are associated with defining general criteria to be used to evaluate individual water system withdrawals. In some cases, adverse economic impacts may be associated with placing additional requirements on individual water systems.

Strategy 2:

Advantages of taking no action on changes to ICC 8.09 include maintaining "status quo" conditions in regards to the workload for existing County staff. No extra burden would be placed on applicants to provide estimates of anticipated peak day demand.

Economic hardships might be experienced by persons buying subdivided land on which water availability has not been determined by the drilling of a test hole. Also, failure to adequately characterize well yield could potentially result in health-related problems associated with exceeding well capabilities, and could result in financial losses to applicants as improvements to individual water systems become necessary.

Environmental Impacts: Failure to adequately characterize ground water availability for all developments and subdivisions may result in adverse impacts to ground water quality and quantity. If individual water systems are inadequately tested for ground water availability, existing wells may be adversely impacted and an increase demand on the aquifer may lead to deterioration of the individual water supplies.

Recommended Strategy: Strategy 1 is recommended for implementation. The GWAC recommends the following:

- 1) The Ground Water Development Classification Matrix should be used when making certain ground water availability decisions pursuant to ICC 8.09;
- 2) Consider revisions to ICC 8.09 to require well tests be designed to ensure the proposed well yield meets the anticipated peak day demand. Taking these actions will ensure adequate characterization and evaluation of the risk posed by proposed developments, and will ensure that individual water systems are designed with adequate protection against problems associated with exceeding well capacities;
- 3) Review State Seawater Intrusion Policy criteria for individual water systems. Consider adopting State criteria or designing local individual water system classification criteria and requirements to minimize adverse ground water impacts to existing and future users, and;
- 4) Consider requiring that all subdivisions drill a test hole and determine water quality. Proof of an adequate water supply for any development or subdivision is not thoroughly determined without conducting a well test.

References:

ICC 16.17, Planned Residential Development/Subdivision Ordinance.

ICC 8.09, Potable Water Sources and Supply.

ICC, 8.07B, Sewage Waste Disposal.

SHB 2929, Growth Management Act, effective July 1 1990.

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #8

Title: Island County Land Development Standards Revisions
(Chapter 11.01 ICC)

Problem Statement: While recharge of ground water is encouraged in the Island County Land Development Standards (Chapter 11.01.110(c)(9) ICC), drainage plans for new development, including construction of County roads, are not required to contain evaluation of recharge facilities as possible alternative surface water management techniques. Additionally, the installation of impervious surfaces can lead to reduction in aquifer recharge and ultimately to ground water resource depletion due to lack of renewal functions. County code does not provide for restrictions in impervious surface coverage where appropriate.

Objective: Reduce adverse effects on ground water recharge in Island County, and increase recharge where feasible.

Existing Programs: One of the intents of the Land Development Standards is to "Protect the public interest in management of surface water drainage, ground water recharge, and related functions of drainage basins, water courses, and shoreline areas..." (Chapter 11.01.010(d) ICC). The code provides planning requirements for construction of retention/detention basins and other drainage and erosion control facilities, including those associated with road construction.

The use of recharge is also encouraged as a drainage management technique through the Comprehensive Plan (II-6).

Suggested Strategies:

Strategy 1:

This strategy consists of making the following changes to the Land Development Standards, ICC 11.01.

A. Make the following change to 11.01.110(c)(9) ICC:

~~"Recharge of storm water into the ground is encouraged; however, recharge potential shall be reviewed and certified by the proponent or his engineer prior to any attempt to recharge to the ground.~~ is the preferred

method of drainage control, and all detailed drainage plans, where applicable, shall contain an evaluation of the potential for using recharge as a means of drainage control. Approved recharge projects shall have an inflow capacity sufficient to handle the design storm. An overflow system which meets the water quality and quantity release standards shall be available for backup. Runoff is required to flow through an oil separator and a filtering system prior to entering the infiltration system unless otherwise approved by the County Engineer. Recharge facilities of any type shall not be permitted in industrialized areas unless approved by the County Engineer. The approval of any recharge project shall not constitute approval of any means by which unstable subsurface conditions may occur."

B. Additionally, 11.01.070(b)(7) ICC, which details plan requirements for County road construction, should be amended as follows:

"Existing and proposed drainage structures, showing type and size of culverts, with direction of flow indicated. Evaluation of the possible use of recharge systems to manage storm water shall be included."

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

According to Engineering Department staff, recharge facilities are becoming more commonly used than in the past. Regulatory incentives would further increase the use of these types of facilities.

The proposed revisions would require evaluation of the potential to use recharge as a technique to manage surface water drainage in all applicable land developments or permits listed in 11.01.030 ICC, and in the construction of County roads. Traditional drainage management usually involves off-island disposal of surface water runoff; recharge systems may have been largely ignored simply because these traditional methods work so well for the purpose for which they were designed: getting rid of unwanted storm water. Benefits of recharge systems may not have been completely understood in the past.

By requiring consideration of recharge as an alternative to the "off-site" approach, the use of recharge systems should become more popular, and future development should thus have less negative impact on Island County's overall recharge balance.

There are some sites that are geologically or otherwise inappropriate for ground water recharge. Similarly, some land uses coupled with improperly constructed recharge facilities may exacerbate ground water contamination problems. Thus, the implementation of this option may prove most effective if coupled with the development of guidelines for construction of recharge facilities (see option paper #16). Additionally, recharge projects should be reviewed by the Health Department as well should quality of recharge water be in question.

This option is intended to increase recharge in the County through encouraging the construction of recharge facilities. When evaluating the potential for using ground water recharge facilities as an alternative for drainage management, the economic feasibility and public health and safety implications of the alternatives must be considered. It should be noted, however, that construction of recharge facilities should not be considered appropriate mitigation for ground water withdrawals, as the quantitative benefits of such systems are difficult to determine, particularly if these systems are not properly maintained.

Environmental Impacts: Ground water recharge facilities can serve as potential avenues for ground water contamination. The contaminant-attenuating ability of different soil types and recharge facility designs vary widely. Thus, without careful site-by-site evaluation, the encouragement of recharge facility construction could lead to adverse environmental impacts in the form of ground water contamination. Additionally, "down stream" effects of creating recharge facilities must be considered, as in any alteration to surface water flow. Improperly sited recharge facilities could conceivably have adverse environmental impacts on such "down stream" uses such as wetlands, shoreline habitats, and human uses, such as irrigation. Thus, pre-development runoff rates should, in many cases, be retained. Detailed environmental review is required on a site-by-site basis.

Some economic impacts may result from implementation of this strategy. Recharge systems often require more

maintenance than other surface water management techniques.

Strategy 2:

If the take-no-action strategy is selected, traditional methods of surface water management will probably continue to prevail over more environmentally aware options. Increasing impervious surface without compensating for ground water impacts incrementally reduces the gross amount of ground water recharge. Selection of the no-action strategy will not necessarily completely preclude the use of recharge facilities to control surface water, but the use of such facilities will certainly be less common.

Environmental Impacts: As indicated above, increases in overall impervious surface generates runoff and leads to reduction in ground water recharge. This effect, combined with the additional demands on available ground water resources associated with development, increases the rate of ground water depletion. At best, this is an inefficient use of available resources; at worst, environmental impacts could be severe in the case of widespread and significant reduction of ground water recharge.

Recommended Strategy: The GWAC recommends that Strategy 1, revising the Land Development Standards (ICC 11.01), be considered for implementation. This strategy will lead to increases in ground water recharge with minimal economic, social, or environmental impacts. Completing the revisions is a relatively simple process, though requiring some staff time, publication costs, and advertising expenses.

References:

Island County Land Development Standards, ICC 11.01.

Island County Planning Department, 1977. Island County Comprehensive Plan: Planning Policy, Phase II. (revised 1984).

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #9

Title: Guidelines/Regulatory Criteria for Construction of Artificial Recharge Facilities

Problem Statement: Construction of artificial recharge facilities is encouraged as part of a comprehensive ground water management program; however, serious ground water quality problems could occur from inappropriately sited or improperly constructed facilities.

Objective: Ensure artificial recharge facilities are constructed in accordance with practices which promote protection of ground water quality.

Existing Policies and Programs: The Island County Land Development Standards (ICC 11.01) encourage recharge as a means of managing post-development drainage, but provide only minimal guidelines for construction of recharge facilities.

Local governments are required by Chapter 173-275 WAC, the Stormwater Management Rule, to adopt regulatory guidelines for construction of recharge facilities. The Washington State Department of Ecology (Ecology) has distributed initial drafts of guidelines and technical manuals for construction of such facilities. Currently, Island County Engineering Department (ICED) staff, in their review of drainage plans, require that details of water quality treatment and certification of soil recharge capability be submitted, and recommend the use of the King County Surface Water Design Manual as best management practices.

ICED will be adopting local guidelines to satisfy the Stormwater Management Rule. Three choices are available: adopt the State guidelines and technical manual; adopt other standards which meet State criteria, such as the King County manual; or further develop the guidelines which were began in Island County in 1985 but which were never completed. Staff in the Engineering Department are currently evaluating these choices, and a set of guidelines satisfying the objective of this option paper is expected to be adopted in early 1991. Therefore, no GWMP action is required to accomplish the above objective.

Recommendation:

It is recommended that the adoption of any standards by the Engineering Department be coordinated with water resource staff from other departments. See the Coordination Program, option paper #19.

References:

Island County Land Development Standards, ICC 11.01.

King County Public Works Department. 1990. Surface Water Design Manual.

Stormwater Management Rule, Chapter 173-275 WAC, 1990.

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #10

Title: Water Resource Overlay Zone

Problem Statement: The existing Island County Zoning Ordinance (ICC 17.02) does not define ground water sensitive areas, nor does it identify special criteria or conditions to be met in the land use permit approval process to assure protection of ground water resources for existing and future users.

Existing Policies and Programs: A water resource overlay is a special designation, often used to regulate sensitive lands, applied to a specific geographic area in addition to the basic zoning requirements. Once these areas have been mapped, density restrictions and performance standards may be developed to protect their ground water resources.

According to the Findings of Fact to the Island County Code (Amended 6/20/88), seven overlay zones have been recommended for use in modifying development potential: wetlands, steep/unstable slopes, noise, scenic corridors, water resources, critical drainage and historic. These overlay zones are intended to ensure that the unique, fragile, sensitive, and scenic areas of Island County are protected and enhanced and that natural constraints are recognized in planning decisions. As stated in the Plan/Zoning Strategy, these overlays are not zoning classifications because they do not regulate density or uses, but instead, propose a management system designed to address specific landforms or natural features of importance to the County. Only two of the overlay zones have been adopted: wetlands and steep/unstable slopes.

Suggested Strategies:

Strategy 1:

Adopt a water resource overlay to protect ground water resources in fulfillment of the intent of the Island County Comprehensive Plan.

Strategy 2:

Develop criteria for the establishment of a water resource overlay in Island County. Ground water data collected as outlined in the Data Collection

and Management Program (option paper #5) and the Ground Water Development Classification Matrix (option paper #6) will provide additional data for developing water resource overlays.

Strategy 3:

Take no action.

Evaluation of Strategies:

Strategy 1:

As stated in the Plan/Zoning Strategy, the proposed water resource overlay would identify areas with supply limitations, areas subject to seawater intrusion, and areas identified for aquifer recharge. The overlay zone designation may provide for increased design flexibility as a means to provide greater resource protection. In some areas, a density restriction may be appropriate. Allowable base densities could be determined by subtracting the acreage of these areas from total land area. Performance standards will be developed to protect such areas from over use.

Establishing a water resource zoning overlay will require delineating the area(s) within which special controls and standards will be enforced. Adequate information about the resource will be required to adequately map the protection areas. It also will require a sophisticated understanding of how development affects ground water resources and the means by which those impacts can be mitigated.

Overlay zoning could include the designation of well head protection areas, recharge protection areas, Aquifer Protection Areas (Chapter 16.36 RCW), and Environmentally Sensitive Areas (SEPA). All of these designations require mapping.

Environmental Impacts: Although there are no direct adverse environmental impacts associated with this strategy, premature implementation of this strategy may result in a failure to provide the necessary ground water protection in those areas which require it, and may impose too stringent regulations on areas which do not require immediate attention. At this time, other management alternatives evaluated by the GWAC appear easier to implement because of the level of mapping required. These other designations include Environmentally Sensitive Areas (option paper #11) and

Critical Areas (option paper #12). These alternatives provide comparable tools for effectively protecting areas with vulnerable ground water resources.

Strategy 2:

Although the water resource overlay is consistent with the intent of the Comprehensive Plan and generally sounds good to those interested in protecting the resource, it would be difficult to implement in Island County. The possible ground water designations (see above) to be used to approach establishing a water resource overlay in Island County each present some inherent challenges when trying to geographically define the exact areas to be protected.

Although a number of ground water investigations have been conducted in the County, there are limitations to which recharge areas, aquifers, and seawater intruded areas can be mapped accurately and defensibly to support specific regulations or requirements. To define areas requiring special ground water protection, additional data is necessary to refine the County's understanding of the extent and the severity of the need to address ground water quality and quantity in these areas.

The Data Collection and Management Program (option paper #5) will assist in gathering additional data in areas with confirmed or potential ground water quality and/or quantity problems. Also, the Ground Water Development Classification Matrix (option paper #6) will serve as a checklist for gathering relevant ground water data. The analysis of data generated through GWMP efforts may be valuable in providing the necessary documentation to support the development of a water resource overlay in Island County in the future.

Environmental Impacts: No immediate adverse environmental impacts are associated with the implementation of this strategy. The collection of additional ground water data will assist in delineating areas which require special ground water protection. In the meantime, other GWMP area designations being considered appear more favorable for implementation at this time.

Strategy 3:

Failure to consider a water resource overlay as an potential ground water management tool, especially as new ground water information becomes available in the

future, may result in ground water development decisions which do not adequately address ground water protection.

Environmental Impacts: Adverse environmental impacts may result from the implementation of this strategy, including the failure to adequately manage ground water resources and to ensure adequate protection. However, if another ground water management alternative is used which adequately addresses the County's needs, adverse environmental impacts can be minimized.

Recommended Strategy: The GWAC recommends Strategy 2. As additional ground water data is collected, the water resource overlay option will be reevaluated and given further consideration as a ground water management tool in Island County.

References:

Final Environmental Impact Statement of The Island County Comprehensive Plan and Zoning Ordinance Strategy, 1984.

Island County Plan/Zoning Strategy, 1984.

Island County Findings of Fact, amended 6/20/88.

RCW 36.36, Aquifer Protection Areas.

WAC 197-11, State Environmental Policy Act, Environmentally Sensitive Areas.

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #11

Title: Environmentally Sensitive Area under SEPA (WAC 197-11)

Problem Statement: Certain activities are exempt from the State Environmental Policy Act (SEPA) review process until action is taken at the local level to eliminate these exemptions. Some of these activities could potentially have adverse impacts on ground water in Island County.

Objective: Ensure that any activities which could adversely impact ground water are evaluated adequately during the local SEPA review process.

Existing Policies and Programs: Pursuant to Chapter 197-11 WAC, Island County has adopted procedures (16.14C ICC, County Environmental Policy) which implement the State Environmental Policy Act (SEPA). Several sections of WAC 197-11 have been adopted by reference into County code. Under SEPA, proposed activities are evaluated in terms of their environmental impacts.

Chapter 197-11-908 WAC of the SEPA regulations grants counties and cities the authority to designate certain portions of their jurisdictions as Environmentally Sensitive Areas (ESAs). The Environmentally Sensitive Area designation allows local governments to define geographic areas requiring special protection. These areas can include but "(are) not limited to areas with unstable soils, steep slopes, unusual or unique plants or animals, wetlands, or areas which lie within flood plains". The ESA designation requires that maps be constructed which clearly identify the areas. These maps are to be adopted by reference as part of the SEPA procedures.

Without an ESA designation, certain activities are automatically exempt from SEPA review. The designation of ESAs allows counties to eliminate certain of these exemptions which are inappropriate to the area. Some of the categorically exempt activities (found in WAC 197-11-800) could potentially lead to significant adverse environmental impact in areas of ground water sensitivity. All of WAC 197-11-800 has been adopted into County code; this means that all activities listed in WAC 197-11-800 are exempt from review pursuant to SEPA.

Declaring all or a portion of Island County an ESA and

removing certain activities from exempt status does not preclude future overlapping ESA designations for areas within the original ESA. In other words, if in the future it is found that there is benefit to defining additional areas within existing ESA's for reasons of environmental concern, whether related to ground water protection or not, nothing in existing State or local law would prevent such action.

Suggested Strategies:

Strategy 1:

In order to remove or revise inappropriate categorical exemptions from County environmental policy code, the County must first adopt language into the code declaring the area to be an Environmentally Sensitive Area. The next step is drafting code identifying those categorical exemptions which are inappropriate, and inserting new code language either eliminating certain categorical exemptions entirely, or specifying the new thresholds for SEPA review of these activities. The specific elements of these code revisions are spelled out below.

- o Designate all of Island County an ESA under per WAC 197-11-908.
- o Reduce the thresholds for SEPA review for certain activities by amending and adopting the following language in the County SEPA procedural rules (ICC 16.14C):

WAC 197-11-800(1)(b)(iii): "The construction of an office, school, commercial, recreational, service or storage building with 4,000 square feet of gross floor area, and with associated parking facilities designed for twenty ten automobiles."

The effect of this change is to provide for SEPA review of commercial buildings where ten or more parking spaces are proposed, instead of the previous figure of twenty or more spaces. Impervious surface coverage of a site is the basis for including this item in the list of exemptions recommended for reduced thresholds in Island County.

WAC 197-11-800(1)(b)(iv): "The construction of a parking lot designed for twenty ten vehicles."

The effect of this change is to provide SEPA review of the construction of parking lots for ten or more

vehicles, instead of the previous figure of twenty or more. Again, impact of impervious surface on ground water recharge should be considered during SEPA review of this type of activity.

- o Remove entirely the following activities from exempt status:

WAC 197-11-800(2)(g): "The installation of impervious underground tanks, having a capacity of 10,000 gallons or less."

The effect of this change is to ensure that all proposed underground storage tanks go through SEPA review, instead of only those with a capacity greater than 10,000 gallons. Potential impacts to ground water quality are to be the focus of evaluation of this activity under SEPA.

WAC 197-11-800(6)(a): "Except upon lands covered by water, the approval of short plats or short subdivisions pursuant to the procedures required by RCW 58.17.060, but not including further short subdivisions or short platting within a plat or subdivision previously exempted under this subsection."

The effect of removing this exemption from County code is to ensure SEPA review of proposed land use actions at an early stage in the proposal. Review can include the effects of impervious surface coverage, ground water withdrawals, and other environmental concerns associated with ground water.

- o Unlike the above exemptions, removing the following exemption from County code requires a request, or petition, to the Department of Ecology:

WAC 197-11-800(4)(b): "Appropriations of one cubic foot per second or less of surface water, or of 2,250 gallons per minute 5000 gallons per day or less of ground water, for any purpose."

The effect of changing the threshold of this exemption in County code is to allow SEPA review of withdrawals of 5000 or more gallons per day of ground water. The amount of 2,250 gallons per minute, or 3,240,000 gallons per day, is ridiculously high, and is completely inappropriate in Island County.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

An ESA designation can provide several important benefits in Island County. It can assist in raising the level of awareness of both the public and governmental agencies regarding the sensitivity of the aquifer system to contamination from overlying land use activities and the limitations of the resource. It would also permit the County to adopt a policy framework concerning land and water-use activities that potentially impact ground water in environmentally sensitive areas.

Several activities are exempt from SEPA review; 197-11-800 WAC contains a complete listing of these activities. Many of these exempt activities could potentially impact ground water in Island County. ESA designation would allow SEPA review of these activities. Should a finding be made that proposals involving these activities could impact ground water in an ESA, the Planning Department has the authority to require mitigation of these impacts. If the mitigating measures cannot be met, then the proposal is denied.

For some land use related activities, local governments are allowed to raise the thresholds for triggering environmental review under SEPA. Under RCW 34.04.060 and WAC 197-11-890, an agency can petition DOE to adopt additional exemptions or to delete existing exemptions by amending SEPA rules.

In determining the number of categorical exemptions to be eliminated, caution should be taken to eliminate only those which have a direct relationship to ground water resources. Eliminating some categorical exemptions will certainly require additional staff time and effort. Eliminating all categorical exemptions could result in an unfavorable public response and potentially create a overwhelming burden to the County staff responsible for processing and reviewing environmental documents.

The above exemptions proposed for elimination were selected due to the potential adverse effects of these activities on ground water. Specifically, the exemptions dealing with commercial structures of 4,000

square feet gross floor area, and with parking lot construction were chosen because of the potential impacts of impervious surfaces associated with these activities upon ground water recharge. It is recognized that in many areas of the County, impact of these activities would be insignificant. In other areas, however, significant impacts could occur. Implementation of this strategy provides an avenue to restrict impervious surface coverage where appropriate, based on site-by-site evaluation. Existing regulations provide no such method of evaluating and restricting impervious surface coverage for commercial/institutional buildings of 4,000 square feet or less with parking for twenty or less vehicles, or for parking lots for twenty or less vehicles.

Siting of underground storage tanks should also be evaluated carefully, given the fact that ground water is the sole source of drinking water for the majority of the County's residents.

A withdrawal of 2,250 gallons per minute of ground water could have disastrous impacts on ground water quantity and, through seawater intrusion, on ground water quality. SEPA is a generally powerful and useful planning tool, but this particular exemption is a definite weakness. Lowering the threshold amount on this exemption would address this weakness.

Information collected from past ground water studies, additional data collection efforts, and the sole source aquifer designation could provide the necessary support required to designate the County as an ESA.

Environmental Impacts: No direct adverse environmental impacts are associated with applying for the Environmentally Sensitive Area status. The objective of obtaining ESA status would be to protect ground water resources, specifically by providing maximum protection through regulating land uses, groundwater withdrawals, the use of chemicals and pesticides, etc. The elimination of certain categorical exemptions, however, could increase the number of environmental documents that must be reviewed by the County, placing more demands on County staff.

Strategy 2:

Failure to recognize the merits of applying for ESA status could result in a potentially effective ground water management tool being overlooked.

Environmental Impacts: Failure to provide SEPA review to all activities with potential ground water impacts could result in adverse impacts to ground water quality and quantity.

Recommended Strategy: The GWAC recommends that Strategy 1 be considered for implementation. Designating Island County an Environmentally Sensitive Area is a defensible and viable ground water management option. Such designation, accompanied with the appropriate elimination of exemptions, will provide significant protection to Island County ground water resources.

References:

ICC 16.14C. Island County Environmental Policy

RCW 34.04. Administrative Procedure Act.

SHB 2929. Growth Management Act, effective June 1, 1990.

WAC 197-11. State Environmental Policy Act.

GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #12

Title: Critical Areas under the Growth Management Act of 1990
(SHB 2929)

Problem Statement: Aquifer recharge protection and enhancement is critical to preserving the quality and quantity of ground water in Island County's sole source aquifers. Ground water data are currently not available to scientifically establish Island County's recharge areas.

Objective: Designate Island County as a critical area pursuant to the Growth Management Act. Develop methodology to classify aquifer recharge areas in Island County, following Chapter 365-190 WAC (Minimum Guidelines to Classify Agriculture, Forest, Mineral Lands and Critical Areas), by the potential for various land uses to degrade ground water quality and by hydrogeologic conditions which facilitate degradation. Adopt interim regulations for the protection of critical areas from development which is incompatible with the function of the designated area.

Existing Policies and Programs: The critical area designation is applied to areas where aquifer recharge is essential for ensuring ground water quality and quantity. On or by September 1991, Island County must adopt interim regulations that preclude land uses incompatible with designated critical areas. Mapping is not required for critical area designation.

The Growth Management Act requires counties to protect critical aquifer recharge areas both in the Comprehensive Plan and in development regulations. The Act requires counties and cities adopt, where appropriate, critical area designations by September 1, 1991. Critical areas include the following areas and ecosystems: wetlands, areas with critical recharging effect on aquifers used for potable water, fish and wildlife conservation areas, frequently flooded areas, and geologically hazardous areas.

Chapter 365-190 WAC represents draft guidelines developed by Ecology to assist counties in classifying critical recharge areas. Aquifer recharge areas are defined as "areas with a recharging effect on aquifers used for potable water" and the specific criteria to identify these areas include:

- (1) the availability of supporting ground water data on the location and extent of the aquifer;

- (2) the vulnerability of the aquifer to contamination; preferably including hydrogeologic analysis of a proposed area, but not excluding the following factors: depth to ground water, soil permeability, soil type, presence of potential contamination sources, and other relevant factors;
- (3) the extent to which the aquifer is an essential source of drinking water.

Existing hydrologic studies, soil, and surficial geologic information can be used to characterize recharge areas. Classification of recharge areas should include their separation into high or low susceptibility to contamination categories. The strategy for recharge classification should be to maintain the quality of ground water, with particular attention to recharge areas of high susceptibility. High susceptibility is indicated by land uses in an aquifer recharge area which contribute contaminants that are likely to adversely impact ground water quality.

In aquifer recharge areas of high susceptibility to contamination, additional studies should be conducted to determine if ground water contamination has occurred. Management strategy for these areas should include consideration of the degree to which the aquifer is used as a potable water source, feasibility of protective measures to maintain potability, and alternative potable water sources.

Chapter 365-190 WAC specifies five important considerations in evaluating the potential for contaminant loading in areas important to recharging the aquifer. These include:

- (1) General land use;
- (2) Waste Disposal sites;
- (3) Agricultural activities;
- (4) Well log and water quality test results; and
- (5) Other information about the potential to cause contamination.

Examples of areas which can be considered for this designation include:

- (1) Sole source aquifer recharge areas pursuant to the Federal Safe Drinking Water Act.

- (2) Special protection areas pursuant to Chapter 90.44 RCW and 90.54 RCW, and Chapter 173-100 WAC.
- (3) Wellhead protection areas pursuant to the Federal Safe Drinking Water Act.
- (4) Other areas meeting "critical recharging effect on aquifers" definition in Ecology's guidelines.

There are no specific mapping or inventorying requirements for critical areas. In most instances, mapping of critical areas would be too inexact for regulatory purposes. However, if mapping is the selected approach to designating these areas, the Act advises counties map for informational or illustrative purposes and not for regulatory purposes.

According to Ecology guidelines, performance standards and definitions are the preferred techniques for mapping in critical areas so they can be specifically identified during the processing of a permit or development authorization. Performance standards deal with the effects various land uses have on the surrounding area and are always measurable. This method of regulating leads to an objective review of the impacts of a proposed development and encourages innovative site plans which reduce negative impacts in critical areas.

Infiltration potential for Island County has been assessed and represents a significant component of recharge. Infiltration potential maps are included in the Part A Technical Memorandum for the GWMP. These maps are based on soil type and surficial hydrology. Additional factors such as hydraulic gradient and hydraulic conductivity in the underlying aquifers is needed to quantify recharge.

Suggested Strategies:

Strategy 1:

There are three components to this strategy:

- 1) Designate Island County as a critical area pursuant to the Growth Management Act of 1990.
- 2) Establish a mechanism to classify recharge areas following Ecology guidelines (Chapter 365-190 WAC).
- 3) Adopt interim development regulations for the protection of critical areas.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

Island County's sole source aquifers exclusively on ground water recharge; and therefore, all land area in the County has a role in promoting aquifer recharge. Using this rationale, Island County should be designated a "critical area" pursuant to the definition provided in the Growth Management Act.

Objective and technical criteria, consistent with Chapter 365-190 WAC, should be developed to classify aquifer recharge areas County-wide. Classification of land into categories of low or high susceptibility to contamination will assist the County in recognizing the differences among these areas and in promoting ground water protection.

Performance standards should be used to evaluate site specific characteristics which potentially affect aquifer recharge. Standards should relate to the following factors:

- annual precipitation
- vegetative cover
- soil conditions
- potential sources of contamination (i.e. seawater intrusion, landfill contamination, septic failure, etc...)
- topography (i.e. slope angle and irregularities)
- impervious surface
- population served
- aquifer conditions (i.e. geology, transmissivity, confined/unconfined, hydraulic gradient, and hydraulic continuity)

The County should draft development regulations that govern changes in land uses and new activities by prohibiting inappropriate actions and restricting, allowing, or conditioning other activities as appropriate. All actions, which could potentially impact ground water recharge would be required to be evaluated in terms of these standards. Applicants should be required to meet performance standards and to provide any additional information necessary to characterize recharge. Actions subject to review could include ground water withdrawals, any proposed development, installation of On-site sewage systems, and

any other actions which may interfere with normal ground water recharge.

The Ground Water Development Classification Matrix (see option paper #6) provides objective criteria which can be used to assist in classifying aquifer recharge areas in Island County. Although the matrix is limited for classifying impacts related to wells, the matrix can be used as an indicator of the potential risks to recharge associated with additional withdrawals and development. If the matrix indicates that the proposed well development poses a high risk for adverse impacts, the area surrounding the well may be considered important to aquifer recharge because of its susceptibility to water quality and quantity problems.

Environmental Impacts: No direct adverse environmental impacts are associated with this strategy. As a result of this strategy, however, an economic burden could be put on applicants to provide the County with adequate ground water information necessary to determine if the proposal may impact aquifer recharge.

Strategy 2:

Under the GMA, preliminary classification and designation is to be completed on or by September 1991. The County must develop a classification scheme and enact interim development regulations to protect critical areas within the same time frame.

Environmental Impacts: Adverse environmental impacts could be associated with failure to protect areas critical to aquifer recharge. Adverse impacts could include public health problems associated with poor water quality and water shortages.

Recommended Strategy: The GWAC recommends that Strategy 1 be considered for implementation. Due to the inadequate ground water information at this time to select areas which require special attention, and the sole source aquifer designation County-wide, the critical area designation should be applied to the whole County. Through the adoption of performance standards relating to aquifer recharge, additional data collection and area characterization, will allow recharge areas to be classified. Through classification of aquifer recharge areas in Island County, interim development regulations that preclude land uses incompatible with designated critical areas can be adopted.

References:

Hart Crowser Inc, 1987, Coordinated Water System Plan
Groundwater Resource Evaluation, report J-1939, Seattle, 49p.

RCW 90.44, Regulation of Public Ground Waters.

RCW 90.54, Water Resources Act of 1971.

SHB 2929, Growth Management Act, effective July 1, 1990.

WAC 173-100, Ground Water Management Areas and Programs.

WAC 365-190 (Draft), Minimum Guidelines to Classify
Agriculture, Forest, Mineral Land and Critical Areas.

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #13

Title: Areas of Special Concern (WAC 248-96, draft revisions)

Problem Statement: Presently there are no specific criteria designed to define areas which require special ground water considerations for on-site sewage treatment.

Objective: Designate specific criteria pursuant to Chapter 248-96 WAC (On-Site Sewage Systems, draft revisions) in order to prevent adverse impacts to ground water quality resulting from failing on-site sewage systems. Evaluate the potential benefits of delineating areas of special concern to protect areas where drinking water aquifers are potentially threatened by on-site sewage systems.

Existing Policies and Programs: ICC 8.07B Sewage Waste Disposal establishes minimum requirements of the ICHD governing sewage disposal systems for individual homes or any other source of sewage waste. ICC 8.07B.210 requires alternate sewage treatment systems for Type 1 soils (highly permeable soils) to provide enhanced treatment.

As defined in the draft revision On-Site Sewage Systems (248-96 WAC), an area of special concern is defined as "any area of definite boundaries, where a health officer or board(s) of health determines that additional requirements for on-site sewage systems are necessary to protect the public health". Areas of special concern can represent areas which require special ground water protection, including:

- o Areas where drinking water aquifers are not geologically protected.
- o Areas that have been designated as special protection areas per WAC 173-200, the water quality standards of ground waters in the State of Washington.

According to the draft of WAC 248-96, once an area is designated an area of special concern, the County Health Department or the State Department of Health may impose more stringent requirements on new developments and/or remedial action on existing developments. Requirements may include, but are not restricted to the following:

- o Additional location, design, and/or performance

standards for on-site sewage systems.

- o Larger land areas for new development.
- o Additional operation, maintenance, and monitoring of on-site sewage system performance.
- o Requirements for upgrading existing on-site sewage systems.
- o Requirements to abandon existing on-site sewage systems.
- o Monitoring of ground water or surface water quality.

At least once every four years every on-site sewage system within "areas of special concern" should be inspected by a certified designer, installer, pumper, regulator, or an improved management entity (ICC 8.07B recommends this be done every three years). System failures should be immediately reported to the local health officer. The following system information should be submitted to the health officer and the property owner within 30 days following the inspection:

- o Location of the tank;
- o Structural condition of the tank, including baffles;
- o Depths of solids in tank;
- o Problems detected with any part of the system;
- o Maintenance needed;
- o Maintenance provided at time of inspection;
- o Other information as required by the local health officer.

Suggested Strategies:

Strategy 1:

Develop specific criteria, pursuant to WAC 248-96, On-site Sewage Systems, to protect ground water from potential contamination from on-site sewage systems. Develop a methodology to designate areas of special concern in Island County.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

Island County Code 8.07B defines inadequate sewage disposal systems as those contaminating surface or ground waters of the state or creating a health hazard or nuisance by discharging on the surface of the ground. In Island County, alternative wastewater treatment systems, such as sand filters and mound systems, may be required at sites overlying shallow aquifers, very porous soils, and/or high water tables.

The major factors that determine the extent to which on-site sewage systems installed in coarse textured soils will impact ground water are system design and characteristics of the number of systems within a given area. In some cases, on-site septic system placement may require more stringent requirements due to the vulnerability of the aquifer as indicated by the hydrogeology.

A recharge area characterized as highly susceptible to ground water contamination may be at risk if special considerations are not made for adequate sewage disposal. It is also important to recognize, however, that on-site sewage systems can recharge over 50% of the water supplied to the home to ground water; and therefore, contribute to ground water recharge in an area (Sapik et al, 1987).

The areas of special concern designation allows the ICHD to impose specific requirements in order to better meet sewage disposal requirements defined in the ICC 8.07B. These requirements will be based on site specific criteria made by the ICHD.

The ground water information that is available is inadequate to accurately define the boundaries of areas of special concern. As ground water information is gathered and analyzed through additional data collection and monitoring, the delineation of areas of special concern may be investigated and a methodology developed.

Environmental Impacts: No adverse environmental impacts are associated with implementation of this strategy. The development of specific criteria would assist the County in minimizing adverse impacts to ground water associated with on-site sewage systems. Adverse economic

impacts may be associated with more stringent requirements on new developments and/or remedial action on existing developments located in areas of special concern.

Strategy 2:

Failure to address ground water contamination which may result from placement of on-site sewage systems in areas requiring special protection may lead to ground water quality and quantity problems which may endanger public health and the natural environment.

Environmental Impacts: Adverse environmental impacts may be associated with the implementation of this strategy. Without special considerations for areas where the aquifer is vulnerable to on-site sewage system contamination, ground water contamination may threaten drinking water supplies.

Recommendation: The GWAC recommends Strategy 1 for implementation. Specific criteria should be developed to prevent the potential adverse risks associated with on-site sewage systems in areas requiring special ground water protection. The possibility of delineating areas of special concern when additional data collection and analysis is available will be evaluated by the ICHD.

References:

ICC 8.07B, Sewage Waste Disposal.

Sapik, D.B., Bortleson, G.C., Drost, B.W., Jones, M.A., and Prych, E.A., 1988, Ground-water resources and simulation of flow in aquifers containing freshwater and seawater, Island County, Washington: U.S. Geological Survey Water-Resources Investigations Report 87-4182, 67 p.

WAC 173-200, Ground Water Quality Standards.

WAC 248-96, On-Site Sewage Systems, Areas of Special Concern, November 12, 1990, draft revisions.

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #14

Title: Special Protection Areas (WAC 173-200)

Problem Statement: Presently, no special area designations exist in Island County which directly address ground water protection.

Objective: Follow and contribute to the development of the draft Ground Water Quality Standards (WAC 173-200) and evaluate the potential benefits of designating Special Protection Areas (WAC 173-200-090) in Island County.

Existing Policies and Programs: The top priority of the State Department of Ecology's 1987 Ground Water Quality Management Strategy was to develop ground water quality standards. These standards were developed under the authority of the Water Pollution Control Act (RCW 90.48) and implement the State's antidegradation policy requiring that natural and existing water quality be preserved and that degradation be prohibited. WAC 173-200 became effective early December 1990.

The Ground Water Quality Standards establish numerical criteria which will generally apply to all ground waters in the saturated zone. The standards are to be implemented through permits and regulatory orders for activities which discharge to ground water. These "activities" include water well withdrawals and water right permits.

WAC 173-200-090 proposes the designation of Special Protection Areas used "to identify and designate ground waters that require special consideration or increased protection because of one or more unique characteristics." The area(s) designated are to receive special attention when "regulating activities, developing regulations, guidelines, and policies, and when prioritizing department resources for ground water quality protection programs." In addition, water right permits and proposed withdrawals can be conditioned in special protection areas.

The following criteria in the Ground Water Quality Standards are to be used to guide designation of Special Protection Areas:

- o Ground waters which support a beneficial use or

ecological system requiring more stringent water quality criteria than drinking water standards;

- o Ground waters including, but not restricted to, recharge areas and wellhead protection areas, that are vulnerable to pollution due to the hydrogeologic characteristics;
- o Sole source aquifer status by federal designation.

To propose an area for the Special Protection Designation, the following is required for submittal to Ecology:

- o A rationale for the proposed designation;
- o Supporting data;
- o A description of the proposed area including geographic and hydrologic boundaries;
- o Documentation showing coordination with state and local agencies, water users, and other affected groups;
- o Additional information Ecology requests to evaluate the proposed designation.

Recommendation: GWMP lead agency water resources staff and the GWAC will evaluate and consider the benefits of designating Island County, or portions thereof, as a Special Protection Area pursuant to WAC 173-200.

References:

WAC 173-200, Water Quality Standards for Ground Waters of the State of Washington, Special Protection Areas.

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #15

Title: Aquifer Protection Areas (RCW 36.36)

Problem Statement: Sources of funding for the implementation of proposed GWMP ground water protection activities have yet to be fully identified.

Objective: Evaluate the benefits to ground water protection in Island County associated with the designation of the Island County Ground Water Management Area, or a portion or portions thereof, as an Aquifer Protection Area (Chapter 36.36 RCW).

Existing Policies and Programs: RCW 36.36 provides the authority for creation of local Aquifer Protection Areas (APAs) to help establish a funding base for ground water protection, monitoring, preservation, and rehabilitation programs.

No programs currently in effect in the County collect per-household assessments for ground water withdrawals or for on-site sewage disposal.

Suggested Strategies:

Strategy 1:

Review the benefits of designating Island County, or a portion or portions thereof, as an Aquifer Protection Area. If favorable, propose a ballot measure asking voters if an Aquifer Protection Area should be established in Island County.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

An APA can be established through a ballot issue and requires a simple majority vote of registered voters in the proposed APA. If approved, the County can collect a per-household user fee on ground water withdrawals and/or on-site sewage disposal. The County may contract

with existing public utilities to collect the fees, or collect the fees itself. Collected revenues can be distributed to all political jurisdictions within the APA.

APAs may use fees collected to support the following:

- o The preparation of a comprehensive plan to protect, preserve, and rehabilitate ground water;
- o The construction of facilities for: a) the removal of water-borne pollution; b) water quality improvement; c) sanitary sewage collection, disposal, and treatment; and d) storm water or surface water drainage collection, disposal, and treatment;
- o The proportionate reduction of special assessments imposed by a county, city, town, or special district in the aquifer protection area for any of the facilities described above; and,
- o The costs of monitoring and inspecting on-site sewage disposal systems or community sewage disposal systems for compliance with applicable standards and rules, and for enforcing compliance with these applicable standards and rules in aquifer protection areas.

The use of revenues generated from the APA is limited to ground water protection planning, ground water treatment facilities, and wastewater treatment facilities. As currently written, the law does not authorize use of the APA revenues for day to day management and regulatory programs for the control of pollution sources such as underground storage tanks, hazardous wastes, and may be of limited value in funding ongoing management.

If an APA ballot is considered, a determination should be made as to what extent proposed ground water protection activities can be supported with APA revenues. If support would be nominal, then the ballot issue should be reconsidered or the Washington State Legislature should be requested to broaden the permitted usage of APA generated funds.

A County-wide assessment for ground water withdrawals and on-site septic systems would generate significant funds, but voters may be unwilling to support such assessments unless it can be shown that they will receive the benefits of such assessments. With counties

that also act as purveyors, such benefits could probably be demonstrated. As the RCW 36.36 is currently written, however, such assessments could be used only on area-specific projects in Island County, benefiting small groups at the expense of the majority. At present, it seems practical that the APA designation be used only in specific geographic regions of the County, such as those water systems or areas suffering from elevated chlorides.

Even if APA funding supports the major portions of the GWMP, there is some risk involved in placing APA measures on the election ballot. Failure of an APA at the polls could alter the way the local legislative body perceives the relative status of ground water protection and management on the political agenda.

In a June 1989 letter to the Prosecuting Attorney of Island County, the State Assistant Attorney General offers a legal opinion of specifics of the APA designation as it would relate to Island County. According to the Assistant Attorney General, in areas where sea water intrusion is present, a local government may properly invoke the provisions of RCW 36.36 to protect, monitor, preserve, and rehabilitate those waters affected. However, according to his interpretation of RCW 36.36, ongoing ground water monitoring programs, facility maintenance, or operation costs may not legally be funded through APA-generated funds.

Environmental Impacts: Environmental impacts of implementing the provisions of RCW 36.36 would be positive; activities listed above as eligible for funding from APA assessments would clearly induce only beneficial environmental impacts. Some adverse environmental impacts may occur through construction of facilities for removal of pollution, water quality improvements, sewage collection, disposal, and treatment, or storm or surface water drainage disposal facilities, but these would require project-specific environmental review. Economic impacts would be experienced with implementation of an APA.

Strategy 2:

Not implementing the provisions of RCW 36.36 would not necessarily detract from ground water protection and management efforts in Island County. Other sources of funding may become available which does not require immediate widespread public support.

Environmental Impacts:

No adverse environmental impacts would occur as a result of not implementing the provisions of RCW 36.36.

Environmental problems that could be addressed using APA generated funds have not been identified as being severe in Island County. If APA status is sought prematurely, inadequate ground water protection may result.

(NOTE: In March of 1991, after GWAC approval of this document, state legislation was passed which broadened the range of activities that APA-generated revenues could fund. The criticisms of APA in the preceding section have been addressed. The original GWAC recommendation was to look at the APA designation after any State code changes.)

Recommended Strategy:

Strategy 1 is recommended for consideration.

The benefits of an APA may merit consideration once public education and involvement has gained widespread support for ground water management efforts in the County. Also, APA's do not necessarily need to be formed County-wide; citizens in a portion or portions of the County may choose to form an APA on their own over a specific geographic area of the County to fund localized projects.

References:

Mosich, D.F. 1989, Legal opinion letter to David Thiele, Prosecuting Attorney of Island County.

RCW 36.36, Aquifer Protection Areas.

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #16

Title: Wellhead Protection Program

Problem Statement: The existence of over 650 public water systems in Island County creates difficulties when trying to regulate the use, storage, and disposal of contaminants within the sanitary control area of a well. Presently, no County-wide wellhead protection program exists to address ground water contamination from surface or subsurface drainage around a well.

Existing Policies and Programs: Although a comprehensive program to protect wellhead and wellfields from contaminant sources does not exist in Island County, certain state and local codes address or provide for special protection of the surface and subsurface around water supply wells. Minimum Standards for Construction and Maintenance of Wells (WAC 173-160) specifically states that water supply wells "shall be protected... from any surface or subsurface drainage capable of impairing the quality of the ground water supply. The well shall be located away from possible sources of contamination." In addition, the DOH presently requires that public drinking water be obtained from the highest quality source and establishes a minimum sanitary control area radius of one hundred feet around a well (Department of Health Drinking Water Regulations, WAC 248-54).

At the County level, the Sewage Waste Disposal Code (ICC 8.07B) requires a minimum distance of one hundred feet from the well to the sewage system absorption field. This distance may be increased by the health officer on a site by site basis to protect public health. It is recognized in the code that reducing setbacks of this type may require review by a ground water hydrologist prior to approval.

Suggested Strategies:

Strategy 1:

Evaluate the benefits of establishing a County-wide Wellhead Protection Program (WHP) under the Federal Environmental Protection Agency (EPA).

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

The Wellhead Protection (WHP) Program is a ground water protection program developed by EPA which can be applied at the local level to control contaminant sources to wells. The 1986 amendments to the Safe Drinking Water Act established a WHP Program designed to protect ground water which is tapped by public water supply wells or wellfields. The Act defines a wellhead protection area as "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield." EPA has identified several goals for WHP:

- o To provide a remedial action zone around the wellhead to act as a safety buffer;
- o To create an attenuation zone to reduce concentrations of known contaminants in ground water before they reach the well;
- o To use wellfield management zones to regulate activity in all or part of the recharge area.

The method used to delineate WHP areas may differ from one community to the next. The first step in implementation of a WHP Program is to identify a defined geographic area that is significant for the protection of quality. Criteria used to define WHP boundaries include distance of contaminant travel, time of contaminant travel, the extent of aquifer drawdown, flow system boundaries, and the capacity of the aquifer to assimilate or attenuate contaminants. These hydrogeologic characteristics have a direct effect on the likelihood and extent of contamination. Once criteria and threshold to delineate WHP areas have been selected by the Department of Health (DOH) and Department of Ecology (Ecology), methods for delineating WHP areas will be established by the state.

EPA has identified six methods to approach WHP area delineation, from simple and low cost approaches (such as establishing an arbitrary fixed radius around a well or well field) to sophisticated and high cost computer modeling techniques. Although relatively simple methods of delineating WHP areas may be most feasible for many public water systems, they may tend to be under-

protected if the aquifer recharge areas are larger than the protection radius or over-protected if the protection radius is larger than the recharge area.

Once a WHP area has been delineated, management programs are developed to outline the management strategies for wellhead protection from direct entry of microbial and chemical contaminants into the well casing. The remainder of the WHP area is to be managed based on an inventory of potential and existing contamination sources. A number of commonly used land use controls, source controls, and other tools are used for protecting WHP areas, including:

- o Zoning ordinances
- o Subdivision Ordinances
- o Site Plan Review
- o Design Standards
- o Operating Standards
- o Source Prohibitions
- o Purchase of Property or Development Rights
- o Public Education
- o Ground Water Monitoring
- o Household Hazardous Waste Collection
- o Water Conservation

Although Washington's well head protection program is still being developed and may require up to an additional two years of preparation, projects can receive funding through the Centennial Clean Water Fund. A number of municipalities, including City of Renton and Tacoma, have already successfully implemented a form of wellhead protection program. The success of these programs has been largely the result of the ability of the municipal wellfield owner to directly regulate land use overlying the wellfield.

Environmental Impacts: No direct adverse environmental impacts would result from implementation of a WHP Program. However, restrictions related to the use of an area surrounding a well could limit the development

potential in some areas, especially where lots are small and narrow. In addition, economic impacts associated with implementing this strategy may outweigh the benefits derived from administering a County-wide wellhead protection program in Island County.

Strategy 2:

Difficulties have been identified with implementation of a WHP Program in unincorporated areas where public well owners do not control the surrounding land use. In these cases, the success of the WHP Program will depend on the willingness of the county government to impose the necessary land use restrictions. In a county consisting of a majority of small public water systems, such as Island County, there may be some resistance to embark on a program requiring "spot" zoning. King County views individualized WHP land use controls for each public well in their county to be unworkable. This may very well be the case in Island County.

An alternative management approach to WHP areas in areas with many public water system wells under different ownerships and overlapping recharge zones would be to develop regional ground water protection requirements. It should be possible to develop generic, county-wide WHP regulations allowing individual well or wellfield owners to apply to the County for protection. This would especially be preferred in situations where well or wellfield owners lack sufficient resources to accurately define the recharge zone.

DOH and Ecology are aware of the inherent difficulties of adopting a WHP Program in unincorporated areas and are developing strategies to facilitate county acceptance of the program. They are requesting that the Washington State Legislature provide explicit financial incentives or assistance to local governments in developing WHP Programs. In addition, DOH and Ecology are assessing the possibility of state participation in the development of centralized data base management systems at the county level.

Environmental Impacts: Adverse environmental impacts may result if a WHP Program is not implemented in Island County. Although, existing County codes attempt to minimize ground water contamination initiated at the wellhead, the wide geographic distribution of wells makes enforcement difficult. The absence of a County-wide WHP program and the increase in the number of wells in the County may present additional difficulties in

regulating potential contamination at the wellhead. A special wellhead protection program provided to those individual requesting assistance may alleviate some of the potential adverse environmental impacts.

Recommended Strategy: Strategy 2 is recommended for implementation in Island County. Wellhead protection in Island County is best applied on a water system-by-water system basis. Because of the distribution and number of public water systems in Island County, it does not make sense to contemplate implementation of the WHP Programs on a County-wide basis. It is recommended that discussion of WHP Programs be relegated to the Technical Assistance Program (see option paper #2). Information on WHP Programs should be made available to individual water systems experiencing contamination or recharge problems.

The GWAC will identify the specific difficulties in establishing a wellhead protection program in Island County and make the necessary recommendations to the responsible federal and state agencies (See Coordination Program, option paper #19). Once a state-wide well head protection program is developed, the feasibility of developing a County program will be further evaluated.

References:

Environmental Protection Agency (EPA); Wellhead Protection: A Decision-Makers' Guide, Office of Ground-Water Protection, EPA 440/6-87-009.

Environmental Protection Agency (EPA); An Annotated Bibliography on Wellhead Protection Programs, Office of Ground-Water Protection, EPA 440/6-87-014.

Environmental Protection Agency (EPA); Wellhead Protection Programs: Tools for Local Governments, Office of Water, EPA 440/6-89-002.

ICC 8.07B, Sewage Waste Disposal.

WAC 173-160, Minimum Standards for Construction and Maintenance of Wells.

WAC 248-54, State Department of Health Drinking Water Regulations.

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #17

Title: Non-Regulatory Land Conservation Programs

Objective: Encourage non-regulatory techniques that conserve lands which contribute to protection of ground water resources.

Problem Statement: Land conservation programs, while historically receiving support from Island County government, could benefit from additional support to significantly contribute to the protection of ground water resources.

Existing Programs: The Ebey's Landing National Historic Reserve, managed by a Trust Board, provides protection to 17,400 acres of central Whidbey Island, the majority of which is maintained as agricultural open space or woodlands (NPS). This is a joint effort between a local citizens committee, local governments, and the National Park Service. Maintaining these areas as open spaces may contribute to protection of the Coupeville area's recharge; a critical need for protecting Coupeville's water supply is indicated by the June 1990 imposition of a temporary moratorium on building due to water availability concerns.

The Transfer of Development Rights element of the Zoning Ordinance (Chapter 17.02.170 ICC) is intended to encourage perpetual preservation of open spaces, wetlands, and farm and forest resources. Owners of sending properties (those properties from which development rights are conveyed) must grant a conservation easement (to the County, state or federal agencies, or land trusts or other tax exempt organizations) which restricts the use of the property to agriculture or forest management uses. The only viable market for the purchase of development rights is in receiving properties, i.e., the County is not in the market to purchase development rights. While contributing to the rural character and the preservation of open space, the TDR program allows some additional densities in the receiving properties. The Comprehensive Plan recommends use of the transfer of development rights program to protect ground water resources:

"Planning efforts should be supported which seek to acquire development rights on agricultural or forest lands. These lands also serve as watersheds for recharge of potable water supplies. Development rights or easements may be acquired by land banking or other

techniques which will preserve these natural resources" (II-16).

The TDR program, though scantily used in the past, is becoming more popular. Several applications involving the use of TDR's are in process in the Planning Department.

The recent passage of the Open Space Real Estate Excise Tax (REET) Act (SSB 6639) grants local authorities the ability to collect excise taxes on real estate sales. Monies collected from these taxes are to be used exclusively for the acquisition and maintenance of conservation areas (including "aquifer recharge areas"). The tax must be approved by a majority of voters of the County. On June 25, 1990, the Board of Island County Commissioners directed the Prosecuting Attorney to prepare such a ballot measure (Proposition 21) to go before the voters in November, 1990. Also under BICC direction, Planning Department staff have prepared an Administration Plan for the program, now titled "The Real Estate Environmental Endowment" (TREE) plan. Proposition 21 failed, however, at the polls on November 6, 1990. The TREE tax can be reconsidered as a ballot measure at later election dates.

The Open Space Taxation Program (Chapter 84.34 RCW) provides substantial tax penalties for changing uses on lands classified as "farm and agriculture land", "timber land", or "open space land" which, in their present use, would "protect streams or water supply", among other functions (Chapter 84.34.020 RCW). In order to minimize property taxes, owners of such lands must register them with the local assessor's office. This program provides incentives, in the form of reduced taxes and threat of substantial penalty (20% of difference between open space tax rates and normal rates, on top of the tax itself), to voluntarily keep the land in one of the open space classifications. This program successfully provides incentives to keep lands in uses which are beneficial to ground water in Island County, and is consistent with ground water management goals.

Chapter 84.34.230 RCW allows counties to levy a property tax called a "conservation futures tax", not to exceed 6 1/4 cents per thousand dollars, which may be used to purchase lands or to acquire development rights off these lands. Such a program could contribute to protection of ground water in Island County.

Other efforts are underway which contribute to recharge protection through the preservation of open lands. For example, the Whidbey-Camano Land Trust currently holds over \$1.5 million in conservation easements in Island County.

Suggested Strategies:

Strategy 1:

Consider levying the conservation futures tax in Island County.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

The conservation futures tax is consistent with ground water management goals, especially the protection of recharge. Not all open space preserved under such a program may benefit ground water, however. The conservation futures program is not specifically designed to protect recharge area. Any open space which could potentially serve as a recharge area is generally considered to benefit ground water, however.

Property taxes are never popular. Careful evaluation should be given to implementing the conservation futures tax as part of the GWMP. Including a tax in the GWMP recommended program could significantly alter the way the public views the GWMP. Strategy 1 is thus put in a form which merely requests that the Board of Island County Commissioners consider the tax, as opposed to an assertive recommendation that the Board implement the tax.

Environmental Impacts: Implementation of the Conservation Futures Tax could have adverse economic impact on property owners. Such action, however, would serve to maintain environmental quality by preserving wildlife habitat, maintaining aesthetic quality, and keeping potential recharge areas intact.

Strategy 2:

Taking the no-action strategy would eliminate concerns over economic impact to Island County landowners. Development interests may view the conservation tax as a threat to their economic goals as it reduces development value of lands.

As mentioned previously, existing programs provide some,

albeit limited, protection of resource lands. Taking the no-action strategy would not detract from these efforts.

Environmental Impacts: Adverse environmental impacts could occur as a result of taking the no-action strategy. Though existing programs do provide some protection of lands of value to ground water management, lack of additional land conservation support could allow the removal of lands from uses beneficial to preservation of natural resources.

Recommended Strategy: Strategy 1 is recommended; implementation of the conservation futures tax in Island County should be considered.

References:

Harbour, Rob. 1990. Personal communication.

ICC 17.02. Island County Zoning Ordinance.

Island County Planning Department, 1990. The Real Estate Environmental Endowment (TREE) Administration Plan.

Island County Planning Department, 1977. Island County Comprehensive Plan: Planning Policy, Phase II. (revised 1984).

National Park Service, 1980. Comprehensive Plan for Ebey's Landing National Historic Reserve, Washington.

RCW 84.34 Open Space, Agricultural, and Timber Lands -Current Use Assessment - Conservation Futures.

SSB 6639 - Washington Laws, 1990 1st Ex. Session. Real Estate Excise Tax - Use to Acquire Local Conservation Areas Authorized.

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #18

Title: Pollution Source Controls

Problem Statement: Agriculture is a significant land use in Island County. In addition, limited industrial land uses are permitted. Improper agricultural and waste disposal practices could adversely impact ground water quality.

Objective: Establish pollution source controls, or Best Management Practices (BMPs), to provide guidance for the minimum essential action or treatment to solve, prevent, or reduce water pollution from a specific activity or facility.

Existing Policies and Programs: Ground water contamination may result from a variety of pollution sources caused by a wide array of human activities. Types and concentrations of contaminants include nitrates from septic systems, industrial solvents, and others. Pollution sources may be nonpoint sources, such as agriculture, pesticide applications, and seawater intrusion, or point sources, such as leaky underground storage tanks. Each pollution source is amenable to different regulatory controls under state or federal law (Jaffe and DiVino, 1987).

Pursuant to the Growth Management Act (SHB 2929, Sec. 7), land use elements of comprehensive plans should provide for protection of the quantity and quality of ground water used for drinking water. The law also requires counties to take action "to mitigate discharges that pollute waters of the state, including Puget Sound or waters entering Puget Sound". The Island County Comprehensive Plan provides language to the effect that pollution of water resources should be avoided (p. II-15).

Ecology has developed ground water quality standards (WAC 173-200), which regulate activities which discharge pollutants to ground water, including ground water withdrawals. These standards were adopted in December 1990.

A number of County provisions relate to the control of point and nonpoint pollution sources. Land Development Standards (ICC 11.01) are intended to protect the public interest in management of ground water recharge, and indirectly address the potential threat to ground water pollution through recharge. Although recharge of stormwater into the ground is encouraged, County standards (ICC 11.01) prohibit the use of

recharge systems in industrialized areas where contamination of ground water is an increased risk. Sewage Waste Disposal regulations (ICC 8.07B) address discharge of effluent to ground water or to the ground surface, including specific system siting criteria and design and construction standards for on-site sewage systems. The Island County Hazardous Waste Plan deemphasizes regulation and emphasizes education to promote proper waste handling and disposal. ICC 8.08 regulates solid waste and sludge handling in Island County to minimize the potential adverse impacts to ground water.

Washington State codes regulate specific land uses which may potentially threaten ground water supplies. WAC 173-304, Minimum Standards for Solid Waste Handling, requires landfill facilities to operate under minimum functional standards to prevent air, land and water pollution and WAC 173-303 outlines requirements for dangerous wastes.

The Island County Agriculture (AG) and Forestry Council has drafted guidelines for AG and Forestry Water Resources Management in Island County (Appendix K). Four main focuses are identified and are to be followed by farmers as well as local and State Government in order to maximize water resources in Island County. These focuses are:

1. Increasing Ground Water Resources
 - o Retention pond siting, design, and funding support
 - o Increasing soil moisture holding capacity
2. Resource Conservation
 - o Overhead sprinkler systems
 - o Drip irrigation systems
3. Drought strategies for agricultural irrigators
4. Water Quality Protection
 - o Well Head Protection
 - o Pesticide handling, storage, and use
 - o Nutrient Management
 - o Agricultural Producer Education

The USDA Soil Conservation Service and the Washington State University (WSU) Cooperative Extension office is actively encouraging the use of these practices. Many of the practices outlined in the proposed AG and Forestry guidelines are consistent with the goals of the GWMP, however, the main focus of this effort is on the agricultural community.

Pollution controls may include engineering specifications, BMPs, or performance standards. They can include the following standards:

- o Facility siting criteria: These are usually applied to discreet physical locations where specific facilities are prohibited. These locations can include flood plains, steep slopes, or excessively permeable soils.
- o Design and construction standards: These affect all new developments and older facilities only when repairs and/or updating are mandated. This would include site preparation measures to allow for a suitable location for a septic system drainfield.
- o Substance control: This is a pollution source control which is designed to provide guidance for the handling, storage, and disposal of certain chemicals and petroleum based products which could adversely affect ground water resources.
- o Permits and licenses: These can be used in several ways to aid in protecting ground water from contaminant sources. They provide for accurate record keeping, an avenue for communication and a means of increasing control over a given activity. Permits can provide incentive for individuals or facilities to avoid using certain pollutants and can have time limits or be revokable based on failure to comply.
- o Fees: To cover the cost of permit administration, fees are usually imposed. Fee schedules may be based on only the administration cost or may include enforcement, monitoring, and facility improvements. The rate structure, therefore, can be an incentive or disincentive.
- o Operational requirements: These requirements for pollution source controls can be very broad. They can include conditions of operation, such as limitations on the hours of operation, the rate or manner of pumping, or the number of hours a well is pumped. Maintenance provisions may include how often regular maintenance is performed and recording the conditions. Regular testing and calibration of values may be included in addition to regular testing by a governmental agency. Special training and education of employees may be necessary.

- o Long-term monitoring: Long-term monitoring is usually necessary for many types of pollution source control programs. This provides background levels of data which indicate pollution trends over time. Pollution source controls may need to be adjusted over time based on improvements or other changes. The GWMP Data Collection and Management Program establishes methodology to monitor water quality.
- o Public education: Education can often play a significant role in local government initiatives, for instance, encouraging safe disposal practices of household hazardous waste. Pollution controls can include the outright ban of certain chemicals, pesticides or activities. To aid in enforcement and in undertaking remedial actions to mitigate pollution, ongoing monitoring is usually a necessary accompaniment to control measures.

Suggested Strategies:

Strategy 1:

There are two main components to this strategy:

- A. Design specific criteria for review of potential ground water contamination associated with industrial or commercial activities, using criteria identified in the Ground Water Development Classification Matrix and additional criteria relating to the ground water contamination risks associated with these activities.
- B. Assist the USDA Soil Conservation Service and the WSU Cooperative Extension Office through Public Education, Conservation, and Technical Assistance Programs in encouraging the use of water resource practices outlined in the AG and Forestry guidelines.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

In certain areas, pollution source controls may be preferred over other geographic controls such as Aquifer Protection Areas (RCW 36.36) or a Wellhead Protection Program. Pollution source controls may be more effective where the underlying geology is too complex to

allow easy delineation of sensitive areas, or where the entire ground water basin is underlain by highly permeable geologic formations.

In some areas, pollution source controls may be more applicable where resources or political support for comprehensive ground water management planning and regulation is lacking. Also, some communities may prefer to identify ground water pollution threats which need to be addressed immediately.

In many instances, a form of pollution source controls are already in place in the County. Some of the standards which are not presently in place will be addressed through GWMP proposed management strategies. Although regulations and recommendations may adequately reflect the level of ground water protection in the County, this should not prevent the investigation of additional ways to control and/or manage point and nonpoint pollution sources.

The GWMP Ground Water Development Classification Matrix (option paper #6) establishes criteria to be used to evaluate all new withdrawals which may potentially impact ground water quality and quantity. The matrix will allow the County to classify the relative impacts of a new well or withdrawal in one of three risk categories based on nine factors that can be estimated or measured from existing and site specific data. These criteria, in addition to information gathered through the Data Collection and Management Program (option paper #5), will assist in objectively and empirically determining the potential ground water contamination risks associated with a proposal. The factors used in the matrix can be regarded as performance standards which can be used prevent and mitigate ground water contamination from seawater intrusion.

The GWMP Education, Conservation, and Technical Assistance Programs encourage the use of specific ground water practices to minimize contamination and mitigate ground water pollution, especially contamination associated with seawater intrusion.

One area which needs to be addressed is the relationship between specific land uses and the associated ground water contamination potential, especially industrial and commercial land uses. Testing the relationship between land use and ground water quality requires accurate characterization of land use, hydrogeologic conditions, and ground water quality. Land use survey maps can be

used to identify the type of general activity to which areas of land are presently dedicated (Area Characterization, Exhibit III-1). Special evaluation criteria should be designed to address industrial and commercial land uses, which do not necessarily involve withdrawals, but which could potentially contaminate ground water, considering such factors as:

- o soil type (infiltration potential)
- o stratigraphy
- o hydrogeology (e.g. the presence of a confined or unconfined aquifer, ground water flow direction)
- o use or presence of potential contaminants
- o number of wells in vicinity

If a proposed or existing industrial use is found above an unconfined aquifer and in an area which is determined critical to aquifer recharge (high susceptibility to contamination; see option paper #12), special mitigating procedures to lessen the potential for contamination should be required or an alternate site should be considered. Where applicable, information gathered through the Ground Water Development Classification Matrix should be used to supplement the evaluation of potential risks associated with industrial and commercial land uses.

Environmental Impacts: No direct adverse environmental impacts would be associated with the implementation of this strategy. Pollution source controls are designed to prevent adverse environmental impacts associated with contamination of ground water. Adverse economic impacts to agriculture and industry may result if individual development is halted as the result of regulatory controls.

Strategy 2:

Presently, state and local regulations provide specific pollution controls in the County. WAC 173-303 and WAC 173-304 outline requirements for dangerous waste and solid waste handling facilities and transport. The AG and Forestry guidelines relating to water resources, if used extensively, will help provide protection of ground water resources. WAC 173-200, the Ground Water Quality Standards, should provide additional protection of ground water for those land use activities requiring permits under the standards.

While these existing policies and codes do provide a certain level of protection, the possibility exists that

some potentially polluting activities may go unchecked under these current regulations. Changing land uses in Island County may increase the number of activities with ground water contamination potential. Lack of updated pollution source controls, whether they be regulatory or non-regulatory, may leave gaps in a comprehensive ground water protection effort.

Environmental Impacts: Failure to address potential ground water contamination associated with growth and changing land uses may result in adverse environmental impacts to public health, flora and fauna, and water quality and/or quantity.

Other elements of the GWMP, such as the Education and Technical Assistance Programs, if implemented fully, will provide some non-regulatory pollution controls.

Recommended Strategy: The GWAC recommends Strategy 1 for implementation. The development of specific performance standards for proposed land uses which potentially threaten ground water quality will assist the County in making land use decisions which effectively prevent potential ground water contamination. Criteria used in the Ground Water Development Classification Matrix should be used to supplement these standards. The GWMP Technical Assistance, Conservation, and Public Education Programs encourage and promote the use of the AG and Forestry pollution source controls to protect water resources in Island County (See Appendix K).

References:

Brown and Caldwell, Adolfson Associates, Sweet-Edwards/EMCON; Preliminary Draft Clover/Chambers Creek Ground Water Advisory Committee, Tacoma-Pierce County Health Department Lead Agency, March 1989.

SHB 2929, Growth Management Act, effective July 1, 1990.

ICC 11.01, Land Development Standards.

ICC 8.07B, Sewage Waste Disposal.

ICC 8.08, Solid Waste and Sludge.

Island County Agriculture/Forestry Council, 1990. Second Draft Outline for AG and Forestry Water Resources Management in Island County.

Island County Planning Department, 1977. Island County

Comprehensive Plan: Planning Policy, Phase II (revised 1984).

Jaffe, Martin and DiNovo, Frank. Local Groundwater Protection, American Planning Association, Chicago, IL. 1987

Third Interim Report Island County Hazardous Waste Management Plan, March 1990.

WAC 173-200, Ground Water Quality Standards.

WAC 173-303, Dangerous Waste Regulations.

WAC 173-304, Minimum Functional Standards for Solid Waste Handling.

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #19

Title: Coordination Program

Problem Statement: A complex issue in protecting Island County ground water is the existence of many overlaying and partially protecting mechanisms at the local, state, and federal levels. Effective use of all existing policies and program mechanisms has been difficult due to their complexity and due to funding constraints.

Objective: The Coordination Program is designed to:

1. Define responsibilities and capabilities of all local, state, and federal agencies in protecting and managing ground water resources in Island County;
2. Ensure that planning efforts in the County which may impact ground water quality, quantity, or recharge such as the Solid Waste Plan, the Coordinated Water System Plan, and watershed management programs are coordinated with the Ground Water Management Program;
3. Ensure that Island County ground water management issues are addressed and considered during the Department of Ecology's (Ecology) efforts to develop:
 - o A Seawater Intrusion Policy (Seawater Intrusion Task Force);
 - o A Well Identification and Well Abandonment Program (Well Identification Task Force);
4. Support the implementation of a Memorandum of Understanding with Ecology regarding water resource management responsibilities.
5. Track the results of the continuing studies taking place on NAS Whidbey Island.

Existing Policies and Programs: A variety of federal programs address many aspects of the ground water pollution problems. However, ground water protection remains a relatively new undertaking for many states and localities. A variety of federal, state and local codes are being implemented independently by different agencies. Many of the ground water protection rules and procedures which exist

demand sophisticated and experienced practitioners to ensure that these are used most effectively. Also contributing to the complexity is the insufficient information available about ground water and its contaminants.

Suggested Strategies:

Strategy 1:

Implement a program in Island County to continue and expand coordination with federal, state, and local agencies participating in ground water protection.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

The Coordination Program will involve the dedication of water resources staff to following ongoing developments in the area of ground water management, whether it be with local, state, or federal agencies. Staff will also be responsible for actively participating in the development of programs, policies and ordinances which would directly affect local ground water management efforts.

Environmental Impacts: No adverse environmental impacts would result with implementation of this program.

Strategy 2:

The absence of coordination among the various agencies could result in gaps in ground water management efforts, the duplication of efforts, and the misallocation of resources which otherwise would potentially benefit ground water management in Island County.

Environmental Impacts: Adverse environmental impacts related to water resources and public health may result from the implementation of this strategy. Ground water quality and quantity issues may not be efficiently and effectively addressed to adequately ensure ground water protection for present and future users.

Recommended Strategy: Strategy 1 is recommended; County staff should continue to pursue coordination activities with the various local, state, and federal agencies to

assure consistency with local needs to protect ground water resources.

References:

Economic and Engineering Services, Inc., 1990, Island County Ground Water Management Plan Policy Analysis.

ICC 8.09, Public Water Source and Supply, September 1990.

RCW 36.36, Aquifer Protection Areas.

State of Washington Department of Health and Island County Health Department, 1989, Salt Water Intrusion Policy for Public Water Systems.

WAC 173-200, Ground Water Quality Standards, in draft form.

WAC 248-54, State Board of Health, Drinking Water Regulations, Revised September 1989.

WAC 248-96, On-Site Sewage Systems, Areas of Special Concern, draft revisions.

ISLAND COUNTY
GROUND WATER MANAGEMENT PROGRAM
OPTION PAPER #20

Title: Memorandum of Understanding

Problem Statement: The unique ground water problems of Island County are in many instances not adequately addressed in Department of Ecology (Ecology) regulations. Prior to December 1990, a formal agreement between Ecology and Island County regarding coordination, monitoring, and the allocation of water rights in Island County did not exist.

Objective: Develop a Memorandum of Understanding (MOU) between Island County and Ecology which outlines:

- o coordination and communication between agencies to promote efficiency in water resources management;
- o test criteria to determine ground water availability and sustainable yield to fulfill the decision making requirements of each agency; and,
- o standards for water quality and quantity monitoring and reporting, including metering.

Existing Policies and Programs: In the preliminary stages of the development of the GWMP, the GWAC expressed the need for the County to establish a formal understanding with Ecology on the process of issuing water rights in Island County. An MOU document was drafted with cooperation between the County Health and Planning Departments and Ecology Water Resources staff and was approved on December 10, 1990.

The County has developed a number of water resource management tools to responsibly manage the resource. The Coordinated Water System Plan encourages new users to hook up to existing water systems. The Island County Health Department subdivision code (ICC 8.09, Potable Water Source and Supply) requires in most instances a source and system approval prior to subdivision approval. This code requires evidence of an adequate water supply prior to issuance of a building permit to any building requiring potable water. In addition "adequate provisions" of ground water availability is required for most subdivisions. A Salt Water Intrusion Policy developed by County and State Health Departments is presently being implemented.

Suggested Strategies:

Strategy 1:

There are two main components to this strategy:

- A. Establish a Memorandum of Understanding between Island County and Ecology.
- B. Encourage GWMP lead agency and ICHD participation in carrying out responsibilities outlined in the MOU implementation plan.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

The first step in the development of the Island County/Ecology MOU was completed when the document was signed in December 1990 (see attachment to this option paper). Certain provisions of this document require definition and implementation. The ICHD and GWMP lead agency should carry out responsibilities outlined in the MOU.

The MOU outlines procedures to be followed by Island County and Ecology water resources staff to coordinate land use and water rights approval. RCW 90.44, RCW 90.54, WAC 173-150, and WAC 173-54 outline regulations, policies and procedures to determine if a water right should be issued. Ecology's role is to assure there is sufficient water available for new wells and guarantee neighbors their wells will not be adversely impacted. In the past it has not always been possible to adequately assure adequate water will be available and that neighbors will not be adversely impacted.

The MOU should improve coordination and sharing of information among the responsible agencies before and after a water right has been issued. Metering requirements will be imposed by both the County and the Ecology. In addition, the MOU identifies agency responsibilities in delineating methods for regularly monitoring withdrawals and water quality, and specific reporting requirements. An aquifer protocol will be developed to assist in minimizing the seawater intrusion potential of a well and assure adequate potable water for existing and future uses.

Ecology is preparing a map which locates all existing water rights. In addition, Ecology is analyzing existing hydrogeologic data to locate areas requiring special ground water protection and areas where additional ground water is available for additional withdrawals. A State seawater intrusion policy and well identification system are being developed.

Environmental Impacts: No immediate adverse environmental impacts are associated with the development of the proposed MOU between Island County and Ecology. This agreement will encourage the optimal use of ground water data for ground water development decisions. The proposed MOU will be a valuable tool in assisting the County in assuring ground water protection.

Strategy 2:

The absence of a MOU between Island County and Ecology could result in ground water development decisions which do not adequately reflect the actual ground water characteristics of an area. As the result, existing and future developments may suffer the consequences of ground water quality deterioration and water shortages.

Environmental Impacts: Adverse environmental impacts may be associated with Strategy 2. The existing water rights issuance process may promote ground water development decisions which fail to address specific hydrologic characteristics of an area. Existing and potential ground water development could be significantly impacted if specific ground water availability criteria is not requested and coordinated among the agencies.

Recommended Strategy: The GWAC recommends Strategy 1 for implementation. The intent of the MOU between the County and Ecology regarding water resource management supports the goals identified in the GWMP. MOU coordination and implementation efforts between the GWMP lead agency, ICHD and Ecology Water Resources staff should continue. In addition, the GWAC recommends that DOH become a party to the MOU to ensure complete coordination of water resources management at both the State and local levels.

References:

RCW 90.44, Regulation of Public Ground Waters.

RCW 90.54, Water Resources Act of 1971.

WAC 173-150, Protection of Withdrawal Facilities Associated with Ground Water Rights.

WAC 173-154, Protection of Upper Aquifer Zones.

MEMORANDUM OF UNDERSTANDING
BETWEEN
WASHINGTON STATE DEPARTMENT OF ECOLOGY,
WATER RESOURCES PROGRAM
& ISLAND COUNTY, WASHINGTON

Related to: Coordination of Water Resource Planning,
Management, and Permitting Activities in
Island County

I. Agency Roles & Authority

Through its Water Resources Program, the Department of Ecology is responsible for the protection, management, and appropriation of the state's water resources. Ecology's role includes administration of water rights, resource conservation and protection, policy development, administration of the Ground Water Management Area Program, regulation of the well drilling industry, and development and enforcement of well construction standards.

Island County Health Department has responsibility for small water system approvals, sewage system approvals, and enforcement of health standards for drinking water. Responsibility for administration of land use planning and permitting, including the issuance of subdivision approvals, rests with the Island County Planning Department.

The growing concern about water quantity and quality in Island County indicates the need for this memorandum of understanding so that state and local coordination in the realms of water resource planning and management can be strengthened. Consideration of the vital and interrelated responsibilities of state and local government agencies provides a clear basis and implicit authority to enter into this memorandum of understanding. This agreement is intended to complement the Island County Ground Water Management Area Plan.

II. Purposes of Memorandum

The purposes of this memorandum of understanding are the following:

- o to prevent water resource degradation or over appropriation

Memorandum of Understanding

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- o to foster state and local government efficiency with respect to water resource management through information sharing, development and implementation of consistent policies and requirements, and division of responsibilities
- o to bolster the technical information base upon which government decisions are made
- o to provide a process for effectively managing Ecology's backlog of water right applications
- o to develop a permit review procedure which provides certainty to the public
- o to enhance public information about the status of water rights administration
- o to aggressively pursue water resource conservation
- o to resolve issues, to the extent possible, at a staff-to-staff level

III. Coordination and Cooperation with Other Agencies

The development of an implementation plan may require the involvement of agencies not party to this agreement. Whenever Ecology or Island County requests, due to statutory requirements or other considerations, that another agency be consulted during the development of implementing activities, that agency shall be notified early in the planning process and their participation shall be requested. This provision applies principally to the Washington Department of Health and incorporated cities and towns within Island County.

IV. Dispute Resolution/Appeal Process

The intent of this memorandum of understanding is to foster a cooperative working environment between state and local levels of government. If, however, in the execution of this document, difference(s) of opinion cannot be resolved to the satisfaction of the involved agency staff, supervisors or managers of the respective agencies will be consulted to clarify issues and reconsider positions. After such consultation, agency staff will resume discussions in an attempt to reach consensus.

If staff-to-staff discussions reach an impasse, the issue will be elevated to respective agency managers and a meeting will be scheduled to renew dialogue and resolve the issue(s).

Signatories to this memorandum will be advised in the event that resolution cannot be achieved. For instance, there may be unclear statutory authority, conflicting policies, insufficient administrative authority, or matters which are

Memorandum of Understanding

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beyond the scope of this memorandum. In such cases, specific recommendations for change will be developed and submitted to appropriate governmental bodies for consideration.

V. Effective Date & Special Conditions

This document shall become effective upon the date of signature by all parties and may be terminated by either party, provided 30 days written notice is given. The document may be amended at any time by written consent of the two parties.

This agreement is not intended to expand upon existing law, or otherwise alter the legal powers and responsibilities of the signatories.

VI. Understandings

This memorandum is based upon the following understandings:

1. Ground water is a finite and precious resource in Island County. Therefore, government agencies must coordinate their decisions to prevent resource degradation or over appropriation.
2. Although several efforts have been made to understand the hydrogeology of Island County, existing data and analyses are insufficient in some geographic areas to make reliable estimates of ground water availability.
3. Elevated chloride levels in ground water are indicative that seawater intrusion is already occurring in certain areas of Island County. Additional withdrawals of ground water and reduction of recharge may cause intrusion in other areas.
4. Prevention of water quality and quantity problems is preferable to solving the problems after they develop, for remedial actions are typically expensive and may have limited effect.
5. Both the Department of Ecology and Island County have specific roles in developing and implementing rational policies for water use. Given the limited fiscal resources available to state and local government, communication and coordination are critical to prevent duplication of effort or conflicting activities.

6. Water conservation must be aggressively promoted to increase the availability of developed sources and to minimize resource degradation.
7. The current 5,000 gallon per day exemption for water rights applications under the Ground Water Code (90.44 RCW) poses difficulties for state and local agencies which are responsible for managing water resources and protecting public health in Island County.

VII. Specific Implementing Agreements

This section identifies specific activities and tasks to which the Department of Ecology and Island County have hereby committed. These are classified and designated accordingly:

Designation *

Short-term activities	(S)
(to be accomplished within a year)	
Long-term activities	(L)
(beyond a one-year timeframe)	
Ongoing activities	(O)

A. Department of Ecology

Under this memorandum, the Department of Ecology is committed to the following:

1. Administration of the water rights program in accordance with applicable laws and regulations. Water Resources Program will issue permits consistent with Ecology's ground water quality standards (Chapter 173-200 WAC). Water right applications will be considered in order of priority date. (O) However, Ecology may choose to evaluate these on an area-by-area basis in order to alleviate the backlog of water right applications. (S) Ecology may issue temporary permits in cases where there are immediate public health and/or safety concerns. (O)
2. Notifying Island County of all water right applications. Such applications shall be reviewed pursuant to WAC 197-11-305 (SEPA Rules-Categorical Exemptions) to determine whether the application is categorically exempt. Ecology shall seek and consider

* Generally, designations appear in parentheses following each provision. For multifaceted provisions, designations appear after each component.

- comments by the county regarding the disposition of pending applications. (O)
3. Pursuing voluntary relinquishment of unused water rights in Island County in cooperation with the county. (O)
 4. Requiring flow meters for all new permitted wells in Island County. (O) Ecology will also require flow meters on existing wells, as necessary, to improve upon the understanding of actual water use. (L) Data collected from these meters will be reported by well owners to Island County Health Department. (O)
 5. Request water quality monitoring of certain wells which are located in areas of known or suspected water quality degradation. A variety of parameters may be monitored, including those which have been identified in Ecology's Ground Water Quality Standards (Chapter 173-200 WAC). Well owners will be responsible for obtaining samples and paying the full cost of water quality tests. Ecology will specify that tests must be performed by a laboratory which has Department of Health or Department of Ecology certification, depending upon the type of analyses required. Well owners will be responsible for sending data to Island County Health Department. (L)
 6. Preparing a map which locates all existing water rights by point of withdrawal, including instantaneous (Q_i) and annual (Q_a) quantities. (S/O)
 7. Analyzing existing hydrogeologic data and advising the county of areas where additional ground water withdrawals will cause impairment of existing rights or resource degradation. Ecology will also advise on areas where water does appear available for appropriation and areas where the availability is unknown. (S/O)
 8. Developing and adopting a seawater intrusion policy to guide water rights administration in areas where a seawater intrusion risk has been identified. (S)
 9. Developing a well identification system to permit data correlation and to provide positive identification of wells in the field. Begin tagging all new wells. (S) Implement well identification program for existing wells (fiscal resources permitting). (L)
 10. Producing public education materials on seawater intrusion. (S)

Memorandum of Understanding

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11. Supporting funding requests for Island County data management with the understanding that data reporting will be conducted in accordance with the Department of Ecology's Data Reporting Manual for the Ground Water Management Area Program. (O)

B. Island County

Under this memorandum, Island County is committed to the following:

1. Administering its building permit, land use, and health-related regulatory programs in accordance with applicable laws, regulations and covenants, including Potable Water Source and Supply (8.09 ICC), the Island County Coordinated Water System Plan, and the Ground Water Management Area Plan. (O)
2. Serving as the manager for ground water data collected from selected wells within Island County. Access to data will be provided to the Department of Ecology. (O)
3. Requiring flow meters for all new potable water supply wells in Island County prior to source approval. (O)
4. Reporting annually to Ecology on the implementation of the Ground Water Management Plan. Island County shall also provide Ecology with any reports or data developed subsequent to this memorandum which is pertinent to the question of ground water availability. (O)
5. Working with Ecology to pursue voluntary water right relinquishments. (O)
6. Advising applicants, as appropriate, that an Ecology "Application for Change of Water Right" is required (e.g. when adding a well to an existing water system or intertying systems). (O)
7. Advising applicants for well site inspection that an Ecology permit is required before drilling a non-exempt well. (O)

C. Department of Ecology and Island County

Under this memorandum, the Department of Ecology and Island County are jointly committed to the following:

1. Developing a plan for implementation of this memorandum. (S)

Memorandum of Understanding

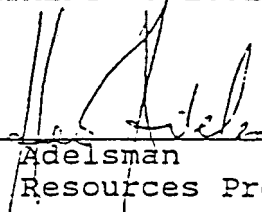
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2. Providing information to the public about steps in the water rights and building permit processes. (S)
3. Vigorously pursuing water conservation efforts in Island County through public education, plans, ordinances, and permit provisos. (O)
4. Meeting at least monthly to review and discuss water-related planning and permitting activities in Island County, including water rights and pending subdivisions and developments. (O)
5. Working cooperatively to reconcile differences in health and water resource requirements as pertaining to instantaneous demand and annual quantity standards. (S)
6. Developing an aquifer test protocol for use in Island County. (S)
7. Evaluating the progress of this agreement after one year and preparing a report summarizing the accomplishments. (S) Reviewing this memorandum periodically and revising it as necessary. (O)


Memorandum of Understanding

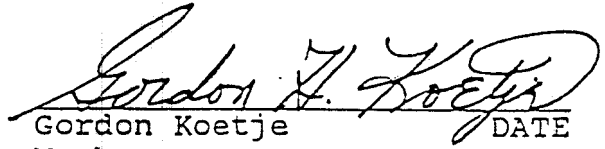
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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

 12/16/90
Hedia Adelsman DATE
Water Resources Program Mgr.

ISLAND COUNTY COMMISSIONERS


Dwain Colby DATE
Chairman


Gordon Koetje DATE
Member


C.R. "Dick" Caldwell DATE
Member